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INTRODUCTORY.

When, one year ago, we issued the first number of "ENTOMOLOGICA AMERICANA", it was not without some doubts as to the success of the enterprise; but with a firm determination to do all in our power to make it one. We are pleased to be able to say that the support accorded us has fully equalled our expectations, and, though by no means a financial success, yet the support even in this way has been encouraging. It has been our endeavor to present not only special or descriptive papers; but also articles of an introductory nature, useful to the young student, and notes on the current Entomological news and literature. Nor have our papers been confined to one or two orders, though naturally Lepidoptera and Coleoptera as interesting the greatest circle of readers received the primary attention. Vol. II, the first number of which we present you herewith will be conducted on the same plan as the previous volume, and if possible even a greater variety and quantity of matter will be presented. We have on hand now a number of valuable papers, and have promises of further supply from leading specialists in all orders. It is unsafe to make specific promises as to the contents of a forthcoming volume, so we shall only say that all classes will find something of interest, and all students something of value in the numbers to be issued during the coming year. We shall endeavor to bring out our paper as promptly as heretofore, and hope that our friends will show their appreciation of our efforts by as promptly sending in their subscriptions.

THE PUBLICATION COMMITTEE
BROOKLYN ENTOMOLOGICAL SOCIETY.

On some of the Genera of our Sphingidae.

By Prof. C. H. Fernald, State College, Orono, Me.

In 1758, Linnæus, in the tenth edition of his Systema Naturæ, established the genus *Sphinx*, making four divisions; the first containing those with the outer margin of the fore wings angulated; the second, those with the wings entire and the abdomen without anal tufts; the third with entire wings but with anal tufts and the fourth of uncertain location.

In 1775, Fabricius published his Systema Entomologiæ in which he adopts the Linnean genus *Sphinx*, restricting it to the first two divisions given by Linnæus, and established the genus *Sesia* for the third division and the genus *Zygaena* for the fourth. In his Genera Insectorum, published in 1776, Fabricius gives the characters of his genera and although very superficial, those given for the genus *Sesia* appear to apply better to the so-called Ægerians than to any of the Sphinges although he had some of both under his genus *Sesia*.

In 1805, Latreille, in the Histoire Naturelle des Crustaces et Insectes, vol. 14, p. 134, separated *tiliae*, *ocellata* and *populi* from *Sphinx* and established for them his genus *Smerinthus*, and removed *stellatarum*, *fuciformis* and *bombyliformis* from the genus *Sesia* where Fabricius had placed them and located them under the genus *Sphinx*. This move purified the genus *Sesia* of its incongruous species and left it restricted as now used by the French and German Entomologists.

In 1807, Fabricius prepared his Systema Glossatorum in which he restricted the term *Sesia* to certain species of the Sphingidæ and proposed the generic name *Aegeria* for the group afterwards known by the English Entomologists as the *Aegeriidae*. Dr. Hagen in his invaluable Bibliotheca Entomologica, states that this work of Fabricius was never published and only advanced sheets were sent out, and the manuscript was lost. But Latreille had two years previously, as shown above, restricted *Sesia* to those species for which Fabricius in an unpublished paper proposed the name *Aegeria*. We should therefore regard *Aegeria* as a synonym of *Sesia* as restricted by Latreille. I should never have troubled myself or anybody else with this history but for the reason that the French, Germans and some Americans have always used these terms in the Latreillian and correct sense, while the English and many among us have used them in the Fabrician sense. For the sake of uniformity somebody ought to change, and as the French and Germans are now really using the terms correctly, we can hardly expect them to do so. The English have used the terms *Aegeria* and *Aegeriidae* so long that it will be a long time before they will adopt new terms, but while we are revising our work and

publishing new lists, will it not be well to make the change from *Aegeriidae* and *Aegeria* to *Sesiidae* and *Sesia*?

In 1777, Scopoli, in his Introductio ad historiam naturalem, proposed the genus *Macroglossum* with the European *stellatarum*, an opaque winged species, as the type. In 1816, Dalman, in the Vetensk. Akad. Handl. proposed the genus *Hemaris* for the European species *fuciformis* and *bombyliformis*, both transparent winged insects allied to our *diffinis* and *thysbe*.

I have not examined these European species, but Mr. J. B. Smith informs me that he has examined *stellatarum* and finds no structural differences from the clear winged species. If he has made no mistake in his examination, there still remains the opacity or transparency of the wings to separate them. It is true that some of the species, on emerging from the pupa, have a few scales on the transparent part, which soon fall off, but I never heard of a case where there was the slightest danger of mistaking one for an opaque winged species.

If we accept the view advanced by Dr. Horn, that genera do not occur in nature, but that they are simply convenient divisions, would it not be more convenient both to the collector and the student, to regard the clearwings as a distinct genus since the transparency of the wings is so obvious a character? If so, our species will belong to Dalman's genus *Hemaris*.

In 1816, Ochsenheimer, in the 4th vol. of his Schmetterlinge von Europa, established the generic name *Deilephila* with *nerii* as the type, and this genus has always been accepted as it seems to include species well separated from those of other genera. In 1816, the Verzeichniss of Hübner purports to have been published, but the part pertaining to the *Sphingidae* could not have been published earlier than 1818 as shown by Mr. Scudder. In this work Hübner has given a large number of generic names, some of which are now in use and generally received.

In addition to the above named authors, Harris, Clemens, Walker, Grote and Robinson, Boisduval, Poey, Bremer, Dupohchel and Swainson have given us genera for our North American species of the *Sphingidae* till, at the present time, we have more than we know what to do with, and the work of elimination has begun.

In the Entomologica Americana, Vol. I, page 81, Mr. Smith has given us a very suggestive and timely paper on our N. A. *Sphingidae* and one which I trust is to be only a preliminary paper to a fuller and more exhaustive one on the same subject hereafter. Without taking the space to call attention to the numerous good features of the work, I desire to

call attention to one or two oversights, and if I am wrong, no doubt Mr. Smith will convince me of the error of my ways.

Our author has taken *Pogocolon* and made *Lepisesia* and *Euproserpinus* synonyms of the same. Without discussing the question whether they are really synonymous, I would merely say that *Lepisesia* was established by Grote in Aug. 1865, *Euproserpinus* by Grote and Robinson in Nov. 1865, and *Pogocolon* by Boisduval in 1874, so that *Lepisesia* should have been used.

The genus *Darapsa* was established by Walker in 1856 but Mr. Butler states in his "Revision", that the "genus was founded upon most heterogeneous material, the first three species [*choerilus* Cr., *myron* Cr. and *pholus* Cr.] being referable to Hübner's genus *Otus*, the fifth, to Walker's genus *Diodosida*, the sixth and eighth, to the genus *Daphnis* of Hübner, the seventh, ninth and tenth, to *Chaerocampa* of Duponchel; there therefore remains only the fourth species, allied to *Chærocampa*, but apparently sufficiently distinct". This is *rhodocera* from the West Indies and is retained by Butler under the genus *Darapsa* as the type. The genus *Otus* was proposed by Hübner for *choerilus* and *myron* and is used for these species and some others by Mr. Butler. Mr. Grote had previously broken up Walker's genus in the same manner but in 1873 he changed his ideas, for some reason not apparent, and took Walker's first species (*choerilus*) for the type and adopted the genus *Darapsa* for our species. Mr. Butler objected to this as the genus thus limited was synonymous with Hübner's *Otus*. But the name *Otus* had been previously used by Cuvier for a genus of birds which prevents our using it for insects and on account of this, Boisduval in 1874, established the genus *Everyx* with *myron* for the type. If *rhodocera* should prove to be really congeneric with *myron* and *choerilus*, then Walker's *Darapsa* should be used for them all, but Mr. Smith who has examined *rhodocera*, informs me that it is really generically distinct and therefore I see no alternative but to use *Everyx* for our species.

In 1873, Mr. Grote established his genus *Calasymbolus* with *astylus* for the type, leaving *myops* with *excæcatus* under *Paonias*, but later he transferred *myops* to *Calasymbolus*. The only characters given were "the genus differs from *Paonias* in the shape of the secondaries, and from *Smerinthus* in antennal structure". With regard to the antennal structure, Mr. Grote probably compared the male of *astylus*, having biciliate antennæ, with the male of *geminatus* which has strongly bipectinated antennæ while in *cerisii* they are biciliate. *Excæcatus*, *myops* and *astylus* all agree in the form of the costa of the hind wings, in the small size of the thorax, the unsunken head and the vestiture of the head and thorax, and in these regards they differ from *geminatus* and *cerisii*. On the other

hand, *cerisii* comes nearer to *excæcatus* in the form of the outer margin of the fore wings than either of the others.

Without enumerating further points of agreement or difference, it seems to me that we must either accept *Paonias, Calasymbolus* and *Smerinthus* or else unite them all under the one genus *Smerinthus*. Which will be most "convenient"?

Mr. Smith states as follows in his remarks under "Darapsa". "I cannot separate *Ampelophaga versicolor* from this genus". Not feeling quite willing to take this *ex cathedra* statement without question, I examined my material (*choerilus, myron* and *versicolor*), with some degree of care and find the following points of agreement. The head is small with the scales forming a central ridge or tuft between the antennæ; proboscis about half the length of the body; palpi of medium size and length, curving up and pressed against the front; eyes of medium size, hemispherical and slightly ciliated; ocelli wanting; antennæ slim, fusiform, prominently hooked at the end, biciliate in the males but simple in the females; thorax short and stout, but little advanced in front of the base of the fore wings, vestiture smooth; abdomen large, cylindrical, tapering rather suddenly on the last segments, without anal or side tufts, segments destitute of spinules along the hinder edge; tibiæ not spinose (fore and middle tibiæ spinose in *choerilus*), middle tibiæ with one pair of comparatively long, unequal spurs, the hind tibiæ with two pairs.

The fore wings have eleven veins (vein 10 wanting), the apex falcate or the outer margin excavate from the apex to the end of vein 4, and rounded beyond. The hind wings have the outer margin excavate between veins 1b and 3, but nearly straight beyond, or they appear to be somewhat produced at the end of vein 1b; costa of all the wings arcuate; frenulum and loop present in the males, loop wanting in the females but the frenulum is represented by a cluster of very short fine bristles.

Why these species should ever have been separated is more than I can conceive. As shown above, they belong to the genus *Everyx*. If any separation is to be made, it would seem that *choerilus* should be the one separated from the other two, because of its spinose tibiæ.

Mr. Smith says that *Deilephila* has "the fore tibiæ at the tip and the tarsi at the sides furnished with longer claw like spines", but by a careful examination of ten examples of *lineata* and fourteen of *chamænerii*, I find the fore tibiæ entirely free from spines but there is a row of longer and larger, somewhat curved spines on the *outside* of the fore tarsi only.

When we find *Daremma, Diludia, Phlegethontius, Dolba* and *Hyloicus* by one stroke of the pen all united under *Sphinx*, is it not time to call a halt? Why not have put *Ceratomia* into the same lot? Did those four little thorns on the larva inspire fear? Surely *Ceratomia* is more

nearly related to *Daremma* than some of the other genera are. The study which I have already given to these genera leads me to think that when Mr. Smith reviews his work and critically examines all the species structurally, including the genitalia, he will also include *Ceratomia*, or else, (what is more likely), he will retain all the above named genera distinct. I have already trespassed too far and will not take time and space to point out their respective distinctive characters.

NOTE BY EDITOR.

Prof. Fernald rather intimates in the preceeding paper that he would like to have me "rise and explain"—a thing I am never averse to doing. In the first place my paper on the Sphingidæ is very general in character, does not pretend to go into the minuter details of structure, and gives only in brief my ideas on the subject, in the form that seemed to me most suited to the needs of the class that I desired to reach. The question of *Sesiidæ* or *Aegeriidæ* is not touched in my paper; but I take this opportunity of signifying my entire concurrence in Prof. Fernald's view of the matter.

Macroglossa or *Hemaris*? The great majority of European authors place *croatica* and *stellatarum* together with the clear winged forms, and Staudinger so catalogues them. *Stellatarum* makes a long reach in habitus to *Aellopos*, while *croatica* has rather more the true *Macroglossa* form. It is a question of opinion, and as my paper was designed to leave out such discussions, I adopted the more comprehensive term. As we have only the clear winged forms in our fauna it may be preferable to use the more restrictive term *Hemaris*.

As to *Lepisesia* or *Pogocolon*, Prof. Fernald is right. The former has priority. The only awkward point is that whereas *Pogocolon* includes *Lepisesia*, that genus being created for a somewhat peculiar species, does not include *Pogocolon*. Mr. Grote's genus was created for this species only; but as the species of *Pogocolon* are really congeneric with *Lepisesia flavofasciata* Mr. Grote's genus must be used.

As to *Darapsa*: No one reading Walker's characterization and noting the general agreement of the forms placed under it, can doubt that the genus created by him was really nothing but *Otus* Hb., and as *Otus* was preoccupied *Darapsa* should properly have been used as a substitute. Mr. Grote's action in breaking up the genus was therefore somewhat arbitrary; but as the term really included heterogeneous material he had perhaps the right to restrict the name to any form he chose. But he should have provided the three species of *Otus* with a new generic term. Mr. Grote's return to *Darapsa* was probably based on a view similar to

mine. As, after all, stability in nomenclature is preferable to a sticking for a matter of unimportant principle, and as *Everyx* Bd. has come to be generally accepted, I will in future use this term, though I still claim that in strictness *Darapsa* should be used. My statement about *rhodocera* was hardly so positive as Prof. Fernald puts it. I have seen the species, and it seems distinct enough from a rather superficial comparison—undoubtedly it is as distinct as a goodly portion of the other Sphingid genera.

The *Smerinthinæ* are all known to me, and I must still insist that *Calasymbolus* is synonymous with *Smerinthus*, while I am not prepared to say that *Paonias* should be united.

"Which is most convenient?" When a genus contains so many species that it becomes unwieldy, then comparatively unimportant characters may be used to separate it as a matter of convenience; but when there are only six species all told, and on Prof. Fernald's own showing characters of equal value with those separating *Calasymbolus*, separate most of the species, then I cannot see where the convenience comes in, if we burden our memories and lists with a genus for every species or two.

My statement as to the armature of *Deilephila* was based on a rather careful examination of several specimens of *lineata*, and a more cursory one of some of the European species. Going over the material again I find Prof. Fernald correct in stating that the fore tibiæ are not armed at tip. The first joint of the fore tarsus has a number of spines so close to the base, that, partially concealed as they are by the vestiture, they seem to belong to the tibiæ. By removing the vestiture the error is at once apparent. This armature of the tarsi at that point is so unusual, while the terminal armature of the tibiæ is so common, that I was perhaps justifiable in assuming the usual state as the actual one. The further statement of the armature of tarsi was loose—it should have been "outside" instead of "sides". This mistake is an error in the use of language and not of observation, for I knew the tarsi were so armed only at the outside.

I regret that Prof. Fernald did not go further in his paper and point out all the differences between those genera I have lumped under *Sphinx*. I have seen and more or less closely examined nearly all of the species in all the genera that I have united, and have not thus far found any characters that could be seized on and definitively stated. Some day not too far distant, I hope to get at this family with an abundance of material at command, and maybe then I can convince Prof. Fernald that I was right—if on the other hand I should find I had been hasty, I shall be prompt in acknowledging my sins.

Notes on North American Zygaenidae and Bombycidae with descriptions of new forms.

By Henry Edwards.

As far as I am able to discover from the literature at my command, the following species of Heterocera await description. It is somewhat remarkable that six distinct forms of *Gluphisia*, (of which genus only one species so far is to be found in our lists) should so long have remained unnoticed, especially as those hereafter described, or at last two or three of them, did not appear to be rare in the localities in which they were taken.

Fam. CTENUCHIDAE.

Scepsis gravis, n. sp.

Very closely allied to *S. fulvicollis*, but a much heavier insect, with the wings broader, and the abdomen much stouter and shorter. The pectinations of the antennæ are longer than in the common species, the clay colored costa is paler and therefore more distinct, the fringe of the primaries is clay color and not dusky or shaded with dusky, and the base of the head is *wholly black*, not at all encroached upon by orange. The vestiture of the thorax is very long, in this respect approaching the character pointed out by Dr. Packard as belonging to the species afterwards described by Mr. Grote as *S. Packardi* (Proc. Ent. Soc. Philad. Vol. 4, 318). In other details it does not accord with this description, and I can but think with Mr. Stretch that Dr. Packard and Mr. Grote had before them some faded examples of *S. fulvicollis*, which as well as the present species, is found in California. I have no doubt of the distinctness of *S. gravis*, whether it be *S. Packardi* or not, and I hardly think Dr. Packard could have overlooked so important a character as the black base of the head, to say nothing of the increased size and broader and heavier appearance.

My specimens, (5 in number) are all from Mendocino Co., Calif., where they were taken by Mr. O. Baron.

Scepsis var. **pallens**, n. var.

I took in Denver, Colorado, during the past summer, several *perfectly fresh* examples of *S. fulvicollis*, of the form alluded to by Mr. Grote, (l. c.) in which the collar is pale buff, indeed, in some specimens it may be called dirty white. This is not owing to fading, as most of the examples found were in excellent order, and not a few recently emerged from the chrysalis. I propose for this the above varietal name.

Lycomorpha coccinea n. sp.

Head, thorax, base of abdomen, basal two-thirds of primaries, and basal half of secondaries bright carmine red. Border of the wings blue black, the inner edge of both borders strongly dentate. Eyes, antennæ, and tip of palpi black. The markings are repeated on the lower side, the legs being brownish black, with crimson tinge. 2 ♀. Arizona. Coll. Hy. Edwards. Expanse of wings 24 mm. Length of body 9 mm.

Melanchroia geometrides Walk.

This species must find a place in our lists, as several specimens were taken by the late Mr. H. K. Morrison at Key West, Florida. By a singular error, Walker gives its locality as "Java" (C. B. M. Vol. 2, p. 387). It is common in Cuba.

Melanchroia cephise Cram.

This species has long been known as belonging to our fauna, having been found in Texas and Arizona. No mention of it is made in either Grote's New Check List or in that published by the Brooklyn Entom. Society.

Fam. **NYCTEOLIDAE** H. Sch.

Earias obliquata n. sp.

Primaries very pale apple green, with an oblique stripe of pure white extending from basal third of internal margin to the middle of costa, which is also white near to the apex. Secondaries sordid white, with slightly pink tinge. Beneath wholly sordid white, stained with reddish along costal margins. Thorax pale green, abdomen sordid white, concolorous with the wings. 2 ♂. Neuces River, Tex. Coll. B. Neumoegen and Hy. Edwards. Expanse of wings 20 mm.

This insect evidently belongs to H. Schäffer's family Nycteolidæ, as does also the genus *Sarrothripa* which has at least three representatives in our fauna, all strangely omitted from our published lists.

Fam. **LITHOSIDAE.**

Hypoprepia plumbea n. sp.

A northern form, in which the primaries are nearly all lead-color, with the costa, internal margin, and median nerve all narrowly buff, the latter once forked behind the cell, the forks stained with pale pink. The tegulæ are pinkish, the abdomen and thorax as in *H. fucosa*. The secondaries have only the basal third pink, the lead colored border being unusually wide. Though I believe this to be but a variety, it is so far removed from the typical examples of *H. fucosa*, that I have deemed it worthy of a name. 2 ♂, 1 ♀. Minneapolis, Minn. July 1884. (At light.)

Fam. **BOMBYCIDAE.**

Lithacodes laticlavia Clem.

This form has been confounded in collections with the well-known *L. fasciola* H. Sch., but though greatly resembling each other, I am confident that they are distinct, and that Clemens' name should be restored for the present form. It is only ¾ the size of *L. fasciola*, is of a much paler color, and wants the dark shading behind the silvery band. This band is also more straight on its edges, and the oblique subapical line is very indistinct and in some cases obsolete. The lower wings are

pale, testaceous, not stained with the dusky shade, as is the case with the larger species.

Average expanse of wings, *L. fasciola*, 22 mm.
" " " " *L. laticlavia*, 16 mm.

Several examples. Texas. G. W. Belfrage.

Limacodes parallela n. sp.

Allied to *L. Y-inversa* Pack., but a very much smaller insect, smaller indeed than *L. rectilinea*. Ochreous, the upper wings darker than the lower. The ornamentation is similar to that of *L. Y-inversa*, but the second stripe of darker shade is quite straight and runs parallel with the first band, throwing the oblique subapical stripe which forms the short arm of the Y to a point considerably nearer the apex than in the allied species. With the exception of the brown stripes the entire insect is ochreous above and below.

Expanse of wings 20 mm. 1 ♂. Indian River, Florida. Type, Coll. Hy. Edwards.

Monoleuca obliqua n. sp.

Size of *M. sulphurea*, paler in color, with the white mark on internal margin quite oblique and directed from about 5 mm. from base of the wing immediately towards the apex. It is slightly waved, and is clear white. Lower wings paler than the upper.

1 ♂. Indian River, Florida. Coll. B. Neumoegen.

Ichthyura luculenta n. sp.

Closely allied to *I. strigosa* Gr. and at first it may be mistaken for it. It is however a little smaller, and of a paler gray color over the whole surface. The thorax is wholly gray, wanting the usual brown longitudinal band, this being represented by a brown shade between the antennæ. Abdomen, legs, palpi, and shaft of the antennæ silvery gray. The lines are more strongly bordered with white than in any other of the species, the basal portion so much so as to leave the lines almost obsolete. The first or basal line starts from a whitish blotch a little above the median nerve, and is not dislocated as in other species. It is waved anteriorly, and bends abruptly outwardly before reaching the internal margin. The second line is very oblique, reaching the internal angle farther posteriorly than in *I. strigosa*. It is bordered outwardly by a brown shade. The third line leaves the second on the submedian nervule, and is rather deeply notched before touching the internal margin. The fourth line is almost straight in its direction, starting from the usual white dash on the costa, (which is, however, very indistinct) and is much waved throughout. There is a fawn colored shade behind its apical portion, but no trace of red scales. The margin is white, and the fringe grayish brown, cut with white at the nervules. The lower wings are smoky drab, palest along the abdominal margin, and with no median band. Beneath smoky-drab, darkest along costa of the primaries, which have a faintly defined paler band. Expanse of wings 28 mm. 2 ♂. Whitings, N. Indiana. (W. G. Gallagher.) Coll. Hy. Edwards.

Ichthyura jocosa, n. sp.

Wholly dark fawn drab, the lines all indistinct, the basal being quite obsolete for its costal half. Second line nearly even in its course, reaching the internal margin considerably before the internal angle. It is shaded behind with reddish brown. Third line leaves the second very much below the median nerve and curves abruptly as it touches the internal margin. Fourth line visible on costa, then lost in a chestnut colored cloud, then very slightly sinuate towards the internal margin. There is

no trace of white on the costal part of this line. A very faint row of brownish submarginal spots. Margin a little paler than the ground color. Lower wings paler fawn-color, with no median band. Underside wholly pale fawn-color, primaries darkest, with very faint median band common to both wings. The thorax above has the usual brown discal stripe, and the palpi are also brown above. Abdomen and legs wholly fawn-color. 1 ♀. Indian River, Florida. Expanse of wings 28 mm.

A very peculiar species, easily distinguished by its extremely faint lines, the want of the white sub-apical dash, and its brownish fawn-color, recalling that of the European *I. anastomosis* L.

Ichthyura astoriæ n. sp.

Very pale, almost sordid white, so that the lines are almost undistinguishable. Basal line bent outwardly in a sharp tooth on the sub-costal nervule. Second line very slightly waved, and faintly bordered with pale brown posteriorly. Its branch, (the third line) runs almost parallel with the basal line. The fourth leaves the costa in a whitish curved streak, is there almost obsolete in a yellowish cloud, where it is much curved and then almost straight to the internal margin. Behind this are some blackish linear spots. Fringe concolorous. Secondaries above pale drab, no median band. Beneath wholly sordid white, with faint median band on secondaries only. Thorax with very pale brown discal line. Expanse of wings 32 mm. 1 ♂. Astoria, Oregon. Coll. Hy. Edwards.

The palest of the genus, nearer to *I. inornata* Neum., but differing greatly in the shape and direction of the lines, as well as in other particulars.

Gluphisia Tearlei n. sp.

Ashen gray, crossed by two slightly waved lines of reddish brown, which are edged distinctly with black. The median space is a little lighter than the rest of the wing. Posterior margins slightly clouded with dusky. A narrow black marginal line. Lower wings dusky. Beneath dusky, without marks. Thorax reddish-brown in front, gray on disk, as is also the abdomen. Exp. of wings 40 mm. Length of body 18 mm. 1 ♀. Lake Tahoe, Cal. (Tearle). 1 ♂. Truckee, Cal. (C. F. McGlashan.)

Dedicated to my friend Osmond Tearle, Esq., by whom this interesting species was first captured.

Gluphisia Wrightii n. sp.

Head, thorax and abdomen very dark gray, thickly speckled with black scales, but lighter on the under side. The primaries are also very heavily covered with black scales. A little above the basal half of wing runs a waved line of pale gray, and from internal angle another waved line more oblique. The space between them is closely scaled with black, but towards the inner margin is an almost square buff patch, across which runs a black line. Space behind the middle band blackish, shading into pale gray at the submarginal dentate line. Margin and fringe pale gray, spotted with black. Secondaries sordid white, with a dusky submarginal shade, connecting with the blackish anal spot. Beneath smoky white, with faint indications of a double median band. Expanse of wings 42 mm. 1 ♀. San Bernardino, Cal.

Kindly added to my collection, by my friend Mr. W. G. Wright, after whom I have named this pretty species.

Gluphisia ridenda n. sp.

Head, thorax and abdomen dark gray, plentifully sprinkled with black, especi-

ally on the upper side. Feet and legs also gray mottled with black. Antennæ with the shaft white, pectinations blackish. Primaries with a buff patch at the base, in which are a few black scales. Behind this a gray band, edged before and behind with black, and sprinkled with black scales. Then a rather wide buff or fawn-color shade, through which runs a waved rather indistinct blackish band. Behind this fawn-color band is another of white or silver-gray, edged with a conspicuous dentate black line, with some black scales towards the apex. The space behind the dentate line is pale gray. Fringe whitish, flecked with black. Secondaries yellowish gray, shading into dark smoky towards the margins. Underside sordid white, dark on the apex of primaries, with faint traces of a median band. Expanse of wings 30 mm. Length of body 12 mm. 3 ♂, 1 ♀. Denver, Colorado. Hy. Edwards, 1 ♂, Montana, Coll. Neumoegen.

Gluphisia rupta n. sp.

Head and thorax above white flecked with a few black scales, white beneath. Abdomen and antennæ wanting in my unique specimen. Primaries with basal space white with black central cloud. A very strongly marked black line runs quite across the wing a little behind the basal third, and from its junction at the internal margin, another line fainter and more oblique, and slightly dentate inwardly reaches the costa at the apical third. The space between these two lines is stained with buff, and there are a few black scales nearest the inner margin. Behind this is a broad space limited by the dentate submarginal band, and clouded heavily with black. Secondaries smoky, a little paler at their base. Fringes of both wings white, spotted with black at the intersection of the nervules. Underside sordid white, the primaries with a broad smoky submarginal band. Size of *G. ridenda*. 1 ♂. Denver, Colorado. Hy. Edwards.

The single specimen I possess of this species, was partially eaten by cockroaches after its capture, but an early examination enabled me to pronounce positively as to its sex.

Gluphisia albofascia n. sp.

Ground color of primaries white with a yellowish tinge. Behind the small basal space is a rather broad black band, narrowing a little towards the costa. On this are a few whitish scales. Then a broad yellowish white space, widest on the costa, where it is stained with black, and behind this to the margin a blackish cloud, growing faint at the margin, and enclosing a dentate submarginal line. Secondaries pure white, with a black shade at the anal angle. Fringes white with black spots at the intersection of the nervules. Underside clear white, the markings of the upper surface plainly visible. Fore tarsi distinctly banded with black. Expanse of wings 32 mm. Length of body 14 mm. 2 ♂. Salt Lake City, Utah. Hy. Edwards.

Gluphisia formosa n. sp.

Size and appearance of the last species, of which it may be but an extreme variety. There is however, a very distinct shade of buff crossing the middle of the wing, and the lines are all very faint, giving the insect a yellowish-gray appearance. The primaries are only very sparsely covered with black scales, and the black anal spot of the secondaries is wanting. Beneath, a very distinct smoky median band crosses the primaries, and appears on the costa of the secondaries in the shape of two spots. 4 ♂, 1 ♀. Salt Lake City, Utah. Hy. Edwards.

It is possible that *G. ridenda* and *G. rupta* are forms of one species, and that *G. albofascia* and *G. formosa* forms of another, but I prefer to

consider them as distinct until future investigation shall determine their true position. The lower wings of the Salt Lake forms are clear white, while those from Denver are smoky.

Orgyia leucographa Walk. (Lep. Heter. B. M., p. 1723.)

I have before me 7 examples of a form of *Orgyia*, which to say the least, are very extreme varieties of the common species. In the first place, there is a marked difference in size, *O. leucostigma* being much larger than the specimen under consideration. The color is uniform stone drab, with the lines very faintly marked, and the usual dark costo-apical entirely obliterated in 3 of the specimens, and only very faintly shown in the remaining 4. The white posterior spot near the internal angle, is also very faint in 2 specimens, stronger in 2, and quite distinct in the other 3. The ground color of all however is the same, stone drab, instead of brownish drab. Two ♀s of this form are also very much slighter and smaller than those of *O. leucostigma*. Could Walker have had this form before him when describing *O. leucographa*? He must have been well acquainted with *O. leucostigma*, as on page 786, l.c., he quotes Smith & Abbott's description, and therefore he cannot in his description of *O. leucographa* refer to the common form of the well known species. However, should this surmise prove incorrect, I propose for the present insect the varietal name of *O. obliviosa*. My examples are all from New Jersey, and are by no means faded, as 3 of them were raised from cocoons found on maple.

Apatelodes indistincta n. sp.

Primaries of a grayish drab, tinted with reddish, the lines and marks all obsolete, the surface dotted with black irrorations. There is near the apex a semi-transparent square spot, with a smaller one beneath it. The fringe is reddish chestnut. The secondaries are reddish testaceous, without marks. Underside wholly reddish fawn-color, with a few black and brown specks, but wholly without the dark shading so conspicuous in *A. torrefacta*. Thorax, color of primaries. Abdomen reddish testaceous with brown dots. Expanse of wings 35 mm. Length of body 18 mm. 1 ♂. Indian River, Florida. Coll. B. Neumoegen.

Apatelodes torrefacta var. **Floridana** n. var.

In this form, which I have never seen, except from Florida, the wings have a much redder shade, the secondaries being almost dull brick red. The double brown spot on the internal margin near the base, is much smaller than in the typical form, while the whitish shade on the abdominal margin of secondaries is almost wanting. The lines are all much fainter, the discal whitish spot, as well as that at the apex, being much more clearly defined. Beneath, the wings are foxy red, darker at the apex of primaries, with the bands only very faintly marked. It is possible that we may have to do with a distinct species. Specimens are in my own collection, and that of Mr. B. Neumoegen.

Hemileuca Maia var. **Lucina** n. var.

A form occuring in Maine, and probably in other of the northern portions of our continent, which appears to deserve at least a varietal name. It is intermediate between *H. Maia* and *H. Nevadensis*, having the primrose band uniformly broad on the primaries and including the discal ocellus, and that of secondaries always wider than in any examples of *H. Maia* seen by me. This band too is of rather different shape, and invariably reaches the posterior margin farther from the anal angle than is the case with *H. Maia*. The wings too are much more transparent than those of the common form, and in some cases appear to be almost denuded of scales. I have during the past summer examined upwards of 300 specimens of *H. Maia*, many of which were raised from the egg, but though varying considerably among themselves, in the width and density of the band, I have seen none that I could not very readily separate from the form now under notice. My specimens (3 ♂, 2 ♀), are all from Norway, Me., and from near Bangor, Me.

Lophodonta plumosa n. sp.

Head, thorax, palpi, and abdomen brownish gray, the latter blackish at its base. Antennæ with extremely long pectinations, giving them a plumose appearance. Primaries brownish gray, with the nervules black. A linear discal spot surrounded by a buff shade, a sub-marginal slightly waved line, composed of blackish spots, between the nervules. There is a whitish cloud on the middle of the costa, and the whole surface is thickly flecked with black scales. Secondaries sordid white, the abdominal margin yellowish, the posterior margin distinctly dusky, the dark shade widening at the apex. Fringe sordid white. Beneath sordid white, the costa of primaries dusky, and the submarginal line faintly shown. Expanse of wings 45 mm. Length of body 22 mm. 1 ♂. Denver, Colorado.

A very distinct and strongly marked species, unlike anything else known to me. I place it provisionally here, the plumose antennæ, and the absence of the tuft at the internal angle of primaries, probably entitling it to generic rank.

Hepialus McGlashani n. sp.

Primaries yellowish fawn-color, of a brighter tint than any North Amer. species previously known to me. From the middle of the base runs a rather broad, very distinct, uneven silvery white line, which traverses the whole extent of the wing, and is entire and uninterrupted throughout its whole course. It runs from its starting point in a curve to the sub-costal nerve near the upper end of the cell, thence obliquely to the internal margin, which it touches by a projecting tooth and thence directly to the apex. It has in the submarginal portion a tooth on each side near the middle of the wing, the posterior one being connected with the margin by a small white dash. Near the base of the internal margin are three small white dots, and along the costa are 6 others, the fourth of which is the largest, and is nearly connected with the forward tooth of the submarginal band. The secondaries are smoky, edged rather broadly with yellowish fawn-color. The fringes of both wings, as well as the thorax and head are of the same shade as the ground color of the primaries. The abdomen is pale smoky. Beneath, wholly smoky, the margins fawn-color, with a pinkish

tinge. Expanse of wings 30 mm. Length of body 16 mm. 9 examples, ♂, ♀. Truckee, Calif. (C. F. McGlashan.)

A very pretty species, in which the silvery band is in very strong contrast with the ground color of the wing. Its nearest ally is *H. Mathewi*, Hy. Edw. (Vanc. Island) but the present species cannot be confounded with any other. Mr. McGlashan, who is doing good work among the Lepidoptera of his district, and to whom I gratefully dedicate this interesting form, writes me as follows, regarding its habits: "The moth flits about the meadows for about 20 minutes just at dusk. Great numbers fly then at twilight, during the latter days of August and first days of September. The females seem to remain on the ground, and the males fly swiftly about in quest of them. At 6:40 their flight begins, at 7 it is ended. They are found only in grassy meadows."

Larval history of Spilosoma congrua, *Wlk.*

By Geo. D. Hulst.

Some few weeks since Mr. David Bruce of Brockport, N. Y., made me a visit, and looking over my treasures identified a certain pair of *Arctiidæ* as *Spilosoma congrua* Wlk. The insect had been in my collection unidentified for 3½ years. But having them now identified, I am able to give a brief larval history, which all that time has been awaiting a name.

On the 8th of June 1882, while walking in the beautiful park in connection with Union College, Schenectady, N. Y., I found a pair of *Spilosoma*, which, while approaching *S. virginica* in appearance, were at once recognized as distinct. The insects were, as I had no other means of carrying them, at once pinned in my hat, which often serves as an entomological box. I was called away as soon as I reached my stopping place in the city to an ecclesiastical meeting, which was of so exciting a nature that I forgot all about my insects until the next morning. But then looking for them, I found that the female before dying had laid a few eggs, which were cared for and brought with me to Brooklyn.

The eggs were laid as are the eggs of *S. virginica* in a mass with something of regularity, and were pure white, not yellowish as in that species. The larvæ emerged June 15th, and resembled the larvæ of *S. virginica*, being of a dull somewhat sooty white, the hairs being long silky and scattered. After the first moult the larvæ took a form and color which remained practically unchanged through their succeeding history, and I give only, and that in brief, their appearance after the last moult.

The head was of a deep shining black color, as were the pro-legs. The anal legs were black above, lighter below. The body dorsally and sub-dorsally was covered with hairs which were deep shining black, though duller in color near base. Laterally, on each segment, was a spot of light tawny or reddish brown hairs, including in part at least the spiracles, and these, often confluent, formed a lateral band. The spiracles were black. The first larva made cocoon, which was loosely composed of hairs, with little or no silk, July 17th. Unfortunately the pupæ all dried up, so that not one emerged. As will be seen the insect is undoubtedly double brooded, and passes the winter like its congeners in the pupal state.

But there is one item of interest; Mr. Bruce has also raised the larva, and noted the same thing. The larva is, after the first moult, black and the hairs are even and comparatively short. The larvæ are in appearance and vestiture not at all like the larvæ of *virginica* or *latipennis*, but like, and indeed hardly to be distinguished from the larvæ of *Arctia virgo*, *nais*, and *arge*. In other words, the imago is a *Spilosoma*, the larva is an *Arctia*. Whether this will be of value in generic reference, and what effect it will have on the validity of two genera which have now, so far as is known, only the color of the insects to separate them, I will leave to others to determine.

On some species of Anthaxia.

By C. H. Roberts.

In the Trans. Amer. Ent. Society, Vol. X, August 1882, Dr. Horn has given us a revision of the genus *Anthaxia* of Buprestidæ.

In his opening remarks Dr. Horn speaks as follows: "In the study of our species I have been unable to find any sexual characters like those which have been observed in the species of Europe. On the other hand, with an incomplete series however, I have not been able to find any of the latter with the tarsal claws toothed as in our *cyanella* and *quercata*. It will be observed that these two species differ from each other in the same manner that *viridifrons* and *viridicornis* do, and the question has arisen in my mind whether they are not respectively sexes of each other, the male in each case having the rougher surface sculpture."

Dr. Horn again calls attention to this matter further on in his article, and urges collectors to study the habits of these species, saying of *cyanella* and *quercata*, "they are so often sent together, and even placed side by side, that I am inclined to suspect a closer relationship than that of allied species, in other words may they not be sexes of one?"

While collecting in Middlesex Co., N. J., last summer, after beating a grape vine I found the species *cyanella* and *quercata* both in the net. This led to a careful search of the vine. I found the two species in large numbers flying about in company, and after watching them for nearly an hour was rewarded for my patience by the happy discovery of the two in copulation.

Continuing my search upon this and other vines in the vicinity I succeeded in capturing twenty-two pairs *all copulated.*

This proves Dr. Horn's surmise to be correct, that *cyanella* is the female form of *quercata*, and thus one of our prettiest species is lost to us, as has often been the case before, by uniting its fortunes with those of a male. I am now more strongly than ever of the opinion that the species *viridifrons* and *viridicornis* bear this same relation to each other, and that among the numerous aliases of *æneogaster* the female will be found.

It is to be hoped that other collectors, with myself, will search for the species of *Anthaxia* next season, and endeavor to establish their relationship to each other.

Book Notices.

In Part III of Tr. Ent. Soc. London for 1885 there is a note "On two remarkable cases of mimicry from Elopura, British North Borneo", by H. J. S. Pryer; one referring to a *Sesiid* bearing a close resemblance to a wasp, but not more so than some others of this family, and the other to a Cerambycid (*Coloborhombus fasciatipennis* Waterh.), which bears a most remarkable resemblance to a *Scolia* like wasp. This latter is a very interesting and remarkable instance of protective mimicry. We have in the American fauna several species which in flight may easily be mistaken for wasps, notably in the north *Bellamira scalaris*, but when the insects are at rest this resemblance ceases.

In the Proceedings of the Society at the April Meeting, the following communication deserves notice.

"Mr. R. M. Christy, who was present as a visitor, read the following note: As requested by my friend Mr. Wm. Cole, I wish to bring under your notice what I think will be regarded as a remarkable obvious case of naturally protective coloring. I was in America in the autumn of 1883, and on the 26th of August, near Carberry, Manitoba, I found a large larva feeding ravenously on the leaves of a small bush (*Eleagnus argentea*), which is so common on many of the drier parts of the prairies, of the Canadian Northwest. A short search brought to light quite a number of others, all feeding on the leaves of the same bush. These I

carefully kept, and in due time they entered upon the pupa stage, enclosing themselves in hard brown pear-shaped cocoons open at one end. Unfortunately, however, the mature insects emerged last spring (1884), while I was again in America, with the result that I am now only able to exhibit two very dilapidated—instead of two very handsome—specimens of that local form or sub-species of *Platysamia columbia* which is peculiar to the prairies of the Canadian Northwest, and which has very recently been named *Platysamia columbia-nokomis* by my friend Mr. Brodie, of Toronto, in accordance with the trinomial system of nomenclature so general across the Atlantic.

I have brought up for exhibition specimens of *Eleagnus argentea.* It will be observed that the leaves are of a very peculiar pale silvery green color, quite unlike that of the leaves of most other shrubs. I have also brought for exhibition a colored drawing of the full-grown larva of the insect, made by my friend Mr. E. T. Seton, of Toronto. It is observable that the color of the larva exactly corresponds during life with that of the leaves of the food-plant; and, as these themselves are of an unusual color, I think it may be regarded as an obvious case of naturally protective coloring.

The total length of the larva is nearly three inches. The head is yellow, with a few black spots; there are also four black spots on the first segment of the body. The first three segments bear yellow clasping legs; the next segment none; the next four bore slightly hairy legs of a light yellowish color; the next segment none; and the last segment a pair of yellow legs. The body bore many protuberances of different kinds, covered with small black spikes. A row of spines down each side of the back. These rows were about one-fourth of an inch apart. Along each side of the body, and separated by the space of about one-fourth of an inch, ran two more rows of spines, the pair on the tail segment showing a brighter blue than the rest. Below this row again there were spines on the first five segments."

It is interesting to know of this new variety of which we had been hitherto ignorant; and it is equally interesting to learn that the trinomial system is so general in America. In Entomology it has been confined almost exclusively to gall insects, and *P. columbia-nokomis* is the only lepidopterous insect so far as we can recollect, burdened with more than one specific name—synonyms of course excluded.

The North American Chrysididæ, by S. Frank Aaron, Tr. Amer. Ent. Soc., XII, pp. 209—248, pl. VI to X.

Mr. Aaron describes the new genus *Diplorrhos*, and a large number of new species in the other genera of the family; giving synopses of the

species of the genera, as well as detailed descriptions. The work seems a good one, and Mr. Aaron figures the parts relied upon for specific and generic characters.

Revision of the Californian species of Lithocharis and allied genera. By Thos. L. Casey. Bulletin No. 5, Calif. Acad. of Sci. January 1886, pp. 40.

Mr. Casey describes 25 new species from California, of which 8 are referred to the new genus *Caloderma*; 1 to the new genus *Oligopterus*, 14 to *Lithocharis* proper, and 2 to the new genus *Metaxyodonta*. The name *Trachysectus* is proposed for the eastern *L. confluens*, the genus being very briefly characterized. An appendix to the main paper contains the description of the new genus *Hesperobium* for *Cryptobium tumidum* Lec.: a table of the genera of *Paederi* with the 4th joint simple, and the description of *Thyce marginata* n. sp.

On the Cynipidous Galls of Florida with descriptions of new species. By William H. Ashmead. Tr. Amer. Ent. Soc., XII, pp. V to IX. (Monthly Proceedings) 1886.

Studies on North American Chalcididæ with descriptions of new species from Florida. By William H. Ashmead, l.c., pp. X to XIX. 1886.

In the latter paper Mr. Ashmead describes *Chalcis flavipes* n. sp.; but as there is already a species of that name by Panzer, the name must fall, and we propose *pallipes* as a substitute. He also describes *Decatoma flavicollis*, which name is pre-occupied by Walker in the same genus; for this species we propose the name *floridana*. He also speaks of the genus *Euplectus*—it should be *Euplectrus*. The error is a small one and would not be noticed but for the fact that there is a coleopterous genus *Euplectus*, and it is possible to lead to some confusion if the correction be not made.

Second Report on the Injurious and other Insects of the State of New York. By J. A. Lintner, State Entomologist. Albany. Weed, Parsons & Co. 1885. 8°. pp. 265. ff. 68.

Prof. Lintner has given us in this report another sample of complete and careful work. Fortunately there was no new pest that required special attention, and the report is made up largely of complete histories of some of the known pests, that for one reason or the other required attention. The Report is very completely indexed, and there is an appendix, containing among other matters a list of papers published by Prof. Lintner during 1882 and 1883. The great majority are in Agricultural papers not usually seen by Entomologists and the list is therefore a useful one.

Society News.

Brooklyn Entomological Society. March 2, 1886. — Fifteen members present, the president in the chair. The Editor for Vol. I, Ent. Am. presented his report, as follows:

Disbursements for Printing and Distributing,		$502.04
Cash received from Publications,	$399.65	
Cash from B. Neumoegen,	91.00	
Deficit paid by Society,	11.39	—$502.04

Mr. Smith was then elected Editor for Vol. II, and Rev. Geo. D. Hulst was elected Assistant Editor. Mr. C. H. Roberts read a note on *Anthaxia cyanella* and *quercata*.* Mr. Smith noted that it was not at all an unusual thing for sexes of one form to be described as distinct species where the sexual characters were obscure or unknown. He had in the Apions based one section of the genus upon the presence of a femoral tubercle on the anterior legs. It has since been proven beyond reasonable doubt that this is a sexual character, and the four species so distinguished are ♂♂ of four other species in the succeeding group. Mr. Angell exhibited a species of *Anthaxia* from Florida which seemed undescribed. Mr. Smith noted the fact that in the genera of Bombyces grouped in Mr. Grote's recent list as *Attaci*, *Ceratocampidæ* and part of those in the *Hemileucini* the antennæ had two pectinations to each joint, and he proposed to separate this group from the rest of the Bombyces which had only one branch to each joint under the family term *Saturniidæ*. The group is divisible into two sub-families: *Attacinæ* with the branches extending to the tip, and *Ceratocampinæ* in which they end abruptly about one-third from tip. Some of these species have also 10 veins to the primaries, instead of 12 as is usual.

Mr. Hulst spoke of some of the results of his studies in the Geometridæ, stating that there would have to be a considerable change in the arrangement of species, based on venational characters discovered by him. Mr. Hulst and Mr. Smith discussed the range of variation in venation, at some length.

Mr. Leng as curator presented to the Society a scheme for the arrangement of Lepidoptera, particularly looking to a gathering of all the information in regard to the local fauna that was obtainable.

Entomological Society of Washington. March 4, 1886. Mr. H. F. Riley, was elected a member of the Society. Mr. Howard exhibited specimens of a Chalcid bred from the galls of *Cynips q.—saltatoris* Eds. The Chalcid is new to science and has to form a new genus.

Mr. Howard remarked on the fungus connected with the "Die-back" disease of the Orange tree. The fungus has recently been supposed by Botanists to grow exclusively on the scales of Coccidæ.

Mr. Smith illustrated the differences in the antennæ of some Bombycidæ, especially describing the structure of these organs in the *Saturniidæ*; characterizing the family, as well as the subfamilies *Attacinæ* and *Ceratocampinæ*.

Dr. Marx exhibited a careful drawing of *Thelyphonus giganteus* and spoke on the structural and physiological characters of this whip-scorpion. Contrary to the statements of authors, this insect has 12 eyes instead of 8, there being 5 on each side close together, two very small, and two in front. He also states that *T. excubitor* Girard, is the ♂ of *T. giganteus*, and described the differences between the sexes. In the discussion following this paper Mr. Pergande described the habits of *Thelyphonus* in digging its burrows and catching its prey as observed in a living specimen kept in a glass jar.

Mr. Schwarz stated that *Rhyncolus corticalis* Boheman, belongs to the genus *Allominus* and is closely allied to but specifically different from, *A. dubius* Horn.

Mr. Schwarz remarked upon the apparent scarcity of the male in *Gnathotrichus materiarius* Fitch. He had never seen a male although a great many specimens of this common species were examined.

* Published ante p. 16.

Fig. 1

Fig. 4

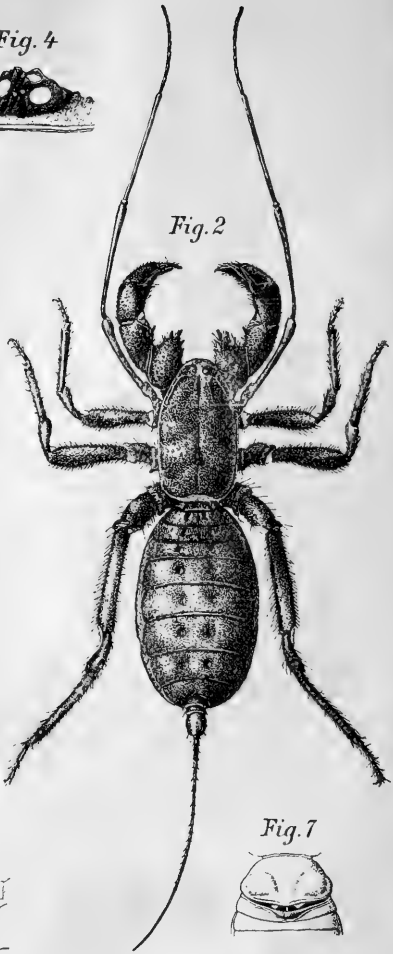


Fig. 2

Fig. 5

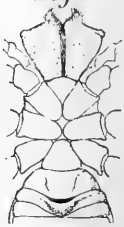


Fig. 3

Fig. 7

Fig. 6

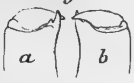


Fig. 8

Fig. 9

Geo. Mory from Nature.

ENTOMOLOGICA AMERICANA

VOL. II. BROOKLYN, MAY, 1886. NO. 2.

On Hemerobius (Psectra) dipterus *Burm.* and H. delicatulus *A. Fitch.*

By Dr. H. A. Hagen.

Prof. Burmeister first described in 1839, Hdb. II, p. 973, No. 1, the interesting *Hemerobius dipterus*. The specimen collected near Leipzig, Saxony, by Prof. Schwägrichen in the Museum in Halle, is a male with rudimentary hind wings. A second specimen from the same locality in Prof. Kunze's collection had been destroyed. The description of the venation by Burmeister is detailed. He remarks that this species is related to *Hemerobius*, similarly as *Mantispa notha* to *Mantispa*. I may remark that the abdomen of *H. dipterus* male, in dry well preserved specimens, has just the same appearance by alternately knotty swellings as *M. notha* in Erichson's figure VI, b.

The first specimen, which I have seen in the Museum at Berlin, in 1849, was collected the summer before by Dr. Erichson in the Botanical Garden at Halle. Prof. Burmeister who happened to be present in the Museum, identified this specimen as *H. dipterus*. It is also a male. Walker, Catal. of the Neuropt. Ins. in the Brit. Museum, 1852, pt. III, p. 298, has only repeated Burmeister's diagnosis.

Mr. J. C. Dale had collected a male specimen from a hazelbush outside of Breach Wood, near Langport, Somersetshire, June 26, 1843. The Proc. of the Ent. Soc. London, March 6, 1854, (reprinted Zoologist Vol. XII, p. 4273) first announced this remarkable discovery, and Mr. John Curtis has given in the Trans. Ent. Soc., Ser. 2, vol. III, p. 56, a short description of the species. The same specimen is redescribed by R. M'Lachlan, 1866, and figured in his Monogr. British Neur. Planipennia. I am not aware of the capture of another specimen in England.

The late Mr. Bremi-Wolf in Zürich sent to me the Hemerobidæ

collected by him in Switzerland for identification in 1852. For greater surety I submitted them also to Dr. Schneider in Breslau, then the best authority for this family. There were in Bremi's collection 19 species (two not sent) and all but three with collection names. The 17 before me belonged to 12 species, all published. In my publication of Bremi's species, Stett. Ent. Zeit. 1865, p. 230, 3 specimens only are mentioned, the types of which were in my collection. The other 9 are *H. nervosus*, *hirtus*, *phaleratus*, *pygmœus*, *limbatus*, *humuli*, *dipterus*, *nitidulus*, *paganus*.

For *H. dipterus* (*niger* Bremi in my synopsis), represented by a bad specimen of the female, Bremi remarks: rare near Kaltenbad on the Rigi.

Dr. Schneider remarked; it is undoubtedly Burmeister's species, but I can not assure the sexes, as the specimen does not allow me to recognize them. As after analogy of *Boreus* and many Lepidoptera the aborted wings are to be found on the female, this specimen should be a male. I can not make out now if *H. dipterus* has been found later in Switzerland and quoted in local catalogues. At least Bremi's specimen was the first known with well developed hind wings.

A few years later I received from the late Mr. Motschulsky a specimen with well developed hind wings, mentioned by me among the Russian Neuroptera, Stett. Ent. Zeit., 1858, p. 130 as *Micromus dipterus* and by an error as a male. The genitals could not be studied as the specimen is glued with the folded wings on mica. The locality is given Jekatarinoslaf, because a small pink lable with R.m. is on the pin. The abbreviated locality could be as well Jekatarinburg (on the Asiatic side of the Ural) but the insects of this locality have in Motschultsky's collection always the label R.m. or. The specimen is still before me and it is the second with developed hind wings seen by me.

In 1857 I discovered and named in the collection of the late Dr. Stein in Berlin, two males and one female in excellent condition, all collected by him near Berlin. The specimens are now in the Berlin Museum.

In 1865, Mr. G. Künow in Königsberg, by beating the grass on a cemetery behind the observatory, collected, August 22, two males. Both are in excellent condition and are in my collection. The genitals are visible; a lancet-shaped horizontal blade and the parts below it make it sure that these specimens with undeveloped hind wings are males. Only two years ago Mr. Künow collected also the female in the same place, of which I possess the two wings of one side in a microscopical slide.

In the Hemerobid. synops. synonym., Stett. Ent. Zeit., 1866, p. 376, after the study of 6 males and 3 females which I had the chance to examine of this rare species I established for it the genus *Psectra*.

Mr. R. M'Lachlan in Trans. Ent. Soc. 1868, in his monograph of the British Planipennia described the male out of the collection of Mr. Dale p. 170 and figured it on pl. IX. He has first pointed out the generic characters.

In Ent. M. Mag. 1879, p. 95, M'Lachlan records a short winged specimen (now in his collection) from Strasbourg, collected by Mr. F. Reiber. He had seen a specimen from Holland, sent by Mr. H. Albarda, with developed hind wings, in which the abdominal formation did not appear to differ from that of the dipterous specimens. Thus, he remarks, the following problems remain to be solved: 1, are the dipterous and complete individuals of opposite sexes, and if so which are males and which females? 2, has the same sex occasionally developed hind wings, although usually dipterous? 3, do the two forms pertain to distinct species?

In C. R. Soc. Ent. Belg. 1882, No. 17, p. 77, M'Lachlan records a dipterous specimen in the Museum R. at Bruxelles from Pavia by Mr. Bertolini. The species was not before known from Italy.

Pastor Wallengren in his Skandinaviens Neuroptera Planipennia, Kgl. Svenska Vet. Ak. Handl., T. IX, No. 8, 1871, gives a very full account of the genus and the species. He could compare 3 specimens, male and female, and collected by himself in July near Farhuld, N. W. Scone, and 2 in the Stockholm Museum collected near this city by Prof. Boheman. The female is here first described. The author could not make a study of the genitals and accepts the common view that the dipterous specimens are males. His descriptions are very detailed and excellent.

Mr. H. Albarda, Tijdschr. v. Ent. Vol. XVII, 1874, Versl. p. 15 to 19, gives a full account of all published on *H. dipterus*. He could study 4 specimens, 3 males and 1 female. Two males collected by Mr. Six in Driebergen, Holland, (recorded as long ago as 1858 in the same Tijdschr. Vol. I, Versl. p. 12 and 39) now in the Museum in Leyden; one collected by Mr. Evarts in Salzbourg, Austria and one collected by Dr. van Hasset near Utrecht. The two last specimens are now in Mr. Albarda's collection. The specimen from Utrecht has well developed hind wings and agrees perfectly with Mr. Wallengren's description. Mr. Albarda believes (I think his magnified figures are not published) that two forms exist, and that all four specimens seen by him are females. The specimen with well developed hind wings has the fore wings longer, and the transversals placed differently; he could not find in the dipterous specimens the hooked anal appendages so remarkable for *Hemerobius*.

This, as far as I know, is all that is published on *H. dipterus* from Europe. There are 20 specimens present in collections, of which I have

seen half; 6 are specimens with developed hind wings, 4 seen by me; 14 are dipterous specimens, 6 seen by me. The 20 specimens are from 14 different localities, and besides those, Dr. Brauer, Neuropteren Europas, 1876, p. 29, quotes Irkutzk, Sibiria.

NORTH AMERICAN SPECIMENS.

Dr. Packard in Proc. Boston S.N.H., 1870, t. 13, p. 407, mentioned the capture of a dipterous specimen of *Psectra diptera* in Brunswick, Maine, Sept. 16th. When Dr. Packard showed it to me, I recognized directly my old European acquaintance, though my collection was still in Europe. Dr. Packard notes that the specimen agrees perfectly well with Mr. M'Lachlan's description and perfectly well with his figure, though the abdomen is blunt and rounded. The type is perhaps destroyed, at least up to the present I can not find it among the insects of the Salem Academy.

I am responsible for the locality Siberia given by Dr. Packard: it should have been S. Russia.

The second specimen, collected near Detroit, Michigan, May 25, 1874, by Mr. H. G. Hubbard is dipterous; the abdomen in bad condition.

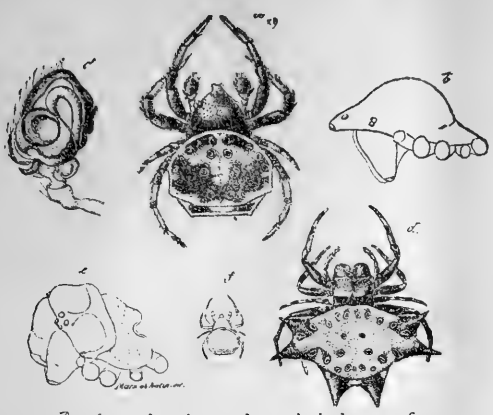
The third specimen was collected in the Blue Hills, near Boston, Mass., June 1875, by the late Mr. Morrison. It has well developed hind wings; abdomen wanting. Both are in my collection.

When I was able last spring to acquire the types of the late Asa Fitch, I was much surprised to find that his *H. delicatulus*, Report I, 1885, p. 96, is a specimen of *Psectra diptera* with well developed hind wings. It was swept from the grass of Prairies in Illinois, October 1, (A. F.). The specimen was covered with mould, but could be cleaned so as to be perfectly recognizable; the abdomen is in bad condition.

The identification with the European species has been made with care. There is only one difference. The hind wing of the female from Königsberg has the sector beginning from the first bifurcation blackish to the margin, as described by Mr. Wallengren; the female from Boston not, except that the small furcations on the apical margin are brownish. The type of A. Fitch has the hind wings rolled together with the abdomen, but the sector though somewhat darker than in the female from Boston is not blackish. The female from Russia is in very unlucky position, but as far as I can see the sector is not blackish. The material before me does not allow me to go farther. Concerning the genital parts I can decidedly affirm, that the two dipterous specimens from Königsberg are males. The specimen from Russia shows a differently pointed end of the abdomen.

Description of Gasteracantha rufospinosa.

By Geo. Marx, M.D.



a. ♂ enlarged 9 times. *b.* cephalothorax of same. *c.* palpus. *d.* ♀ enlarged 2 times. *e.* cephalothorax of same. *f.* ♂ in natural proportion to ♀.

Although there are over 170 species of *Gasteracantha* at present known and described. from all parts of the globe: and several species are quite common in the U. S., there are only two males known for the 170 females. One is that of *Gast. parvula*, described by Thorell, the other that of *Gast. Rogersii*, described by Cambridge, from Africa.

I received through the kindness of Mr. H. G. Hubbard of Crescent City, Fla., a female in alcohol (fig. d) with the notice to examine the ventral side and see if the little black spider, closely adhering to it, was a young one, or the long looked for, male. It was difficult to separate the two specimens, as the little one had securely fastened itself with the aid of several strong threads upon the rugose surface of the venter of the larger one. On examination it proved to be the male (fig. a).

This was interesting *per se*, but more remarkable is the great difference in the structure between the two sexes and especially in the cephalothorax.

We need not wonder that in the male all spinous processes of the abdomen are wanting, for such is also the case in the 4 species of *Acrosoma*, indigenous to the U. S; but there is generally a certain similarity preserved in the structure of both sexes, even if the cepha'x in the ♂ is often larger and its pars cepha. higher.

Now in *Gasteracantha* the cepha'x of the male is on an entirely different plan for it is here drawn out into a pointed projection over the mandibles, the highest point being at the base of the p. ceph. (fig. b), while in the ♀ it is at the vertex of the cepha'x—the lateral eyes are removed far behind the posterior middle eyes.

The fact that the male was found fastened to the underside of the ♀ suggests that it might perhaps make its abode there for the whole period of sexual intercourse or even longer, and it would be of great interest, if the readers who reside in the Southern States would study the habits of this spider and make known the result.

DESCRIPTION.

Male: Cephalothorax long 1 mm., broad 0.8. Abdomen long 1.5, broad 1.8 mm.

Cepha'x blackish brown, finely granulated. Pars thoracica covered by abdomen; pars cephalica distinct, semi-globose, drawn out into a beak-like projection over the mandibles.

Eyes. A.M.E. largest, close to margin of clypeus. Square between the 4 M.E. longer than broad, narrower between P.M.E.; L.E. contiguous, on the side of cepha'x, much behind the P.M.E.

Abdomen semi-circular in front, sides straight, sloping toward the apex which is squarely cut. Near the posterior border is a ridge which runs parallel with it and which forms a break in the plane abdominal plate. Dark brown. At margin 10 foveæ or sigillæ, 8 of which are at the semi-circular front and two behind. 4 foveæ in centre of abdominal plate; the 2 anterior ones close together, the posterior farther separated than from the anterior. No spines. Abdominal plate with a narrow white margin and larger white spots between foveæ; a large white mark between central foveæ. Underside of abdomen black, rugose, conical toward the centrally located spinerets.

Legs 1 and 2 stout, femur brown, rest of joints testateous with brown bands at their extremities 3d pair very small, 4th pair long and slender and colored like 1 and 2.

Palpus short, black, tibial joint with a hook externally, tarsal part broad, spoon-shaped, fig. c.

Female: Cepha'x long 3.3, broad 3. Abdomen long 5.5, broad 9. Breadth with the spines 13 mm. Legs I, 8.8, II, 8.6, III, 6, IV, 9.3 mm.

Cepha'x square and broad in front, rising suddenly, descending abruptly to pars thoracica; a little longer than broad, of a glossy black color rarely brownish, and scantily covered with thin white hairs. *Eyes* small, black; the lateral, contiguous. *Mandibles* vertical, stout and very prominently convex at the base, glossy black and hairy. *Maxillæ* short, broader than long, rounded at tip; black with a lighter margin on inner side. *Labium* triangular, rounded, very short, black. *Sternum* emarginate at margin, with a vertical spinous elevation between coxæ IV; glossy black. *Palpi* black with orange colored rings on all joints. Abdomen elliptic, of bright lemon color. Six spines; four lateral, two posterior. First lateral pair smallest, second as long as posterior pair. This pair is placed upon a common base which is a little below posterior margin of abdominal shield. All spines are of a bright scarlet color with a darker tip and are clothed with a short and robust pubescence, each hair standing upon a little tubercle. The *sigillæ* or *foveæ* are oval and of a dark reddish brown color. Ten of these are placed on the anterior margin of the abdomen, reaching around from the base of one anterior lateral spine to the corresponding one at the other side—and nine are placed from the one posterior lateral spine around the posterior margin of the abdomen to the other p. lateral spine. In the centre of the abdominal shield are four sigillæ placed in a trapez, narrower in front. The hard black surface of the underside of the abdomen is interrupted by about six impressed lines, and is maculate with irregular orange colored spots, scattered over the whole region. *Vulva* an oval, convex, very glossy, and deep orange colored tubercle without any apparent orifice. Legs black, with orange colored rings on tibia, metatarsus and tarsus.

Synopses of Cerambycidae.

By Chas. W. Leng, B. S.

(Continued from p. 136, vol. 1.)

OBRIINI.

This tribe contains only small species, distinguished by the front coxæ being more prominent than usual, sometimes nearly conical and frequently contiguous, but completely inclosed behind. Following the "Classification" the genera are arranged as follows:

Eyes variable, abdomen ♀ deformed 1
Eyes finely granulate, elytra more or less subulate or abbreviated 2
1.—Palpi with last joint broadly triangular ..... **Poecilobrium.**
Palpi slightly dilated, tarsi tumid (or swollen) ..... **Eumichthus.**
Palpi not dilated, last joint cylindrical;
  Eyes coarsely granulate;
    Prothorax much narrowed behind ..... **Phyton.**
    Prothorax equally narrowed before and behind, tuberculate at sides ..... **Obrium.**
  Eyes very finely granulated; prothorax with lateral and dorsal tubercles;
    Punctures fine, flying hairs sparse ..... **Hybodera.**
    Punctures coarse, flying hairs long and numerous;
      Mesosternum wide ..... **Callimus.**
      Mesosternum narrow ..... **Megobrium.**
2.—Elytra elongate and subulate ..... **Callimoxys.**
Elytra short, dehiscent and separately rounded at tip ..... **Molorchus.**

POECILOBRIUM, Horn.

Contains one species described by Dr. Leconte as a *Callimus*. It is a small highly polished blue species with elytra sparsely punctured and thighs sometimes yellow. The prosternum is sparsely punctured, the abdomen nearly smooth.

P. chalybaeum Lec. S.M.C., No. 264, 1873, p. 189. Length .24 in. = 6 mm. Hab.* California.

EUMICHTHUS Lec.

A small species from Vancouver, dark brown, finely punctured and pubescent, with two narrow cinereous elytral bands, between which the color is darker. It has a resemblance from the arrangement of bands to *C. decussatus*. The elytra are marked near the base with a few large scattered punctures from which proceed long black flying hairs. The first two joints of tarsi are swollen.

* I am indebted to Mr. Samuel Henshaw of Boston for his kind assistance in revising the lists of habitats which would have been far less complete without his aid.

E. oedipus Lec. S.M.C., No. 264, p. 190. Length .20 inch. = 5 mm. Hab. Vancouver's Island.

PHYTON, Newn.

Contains two small shining testaceous species with elytra unusually prettily marked with darker lines. The prothorax is constricted before and behind, considerably dilated at sides before the middle and strongly narrowed behind.

P. pallidum Say. J.A.P., III, 1823, p. 412; Hald. Trans. Am. Phil. X, p. 42; Lec. J.A.P., sec. 2, II, p. 22; *lepidum* Dej. Cat., 3d ed., p. 358; *linum* Newn., Ent., p. 18; *nitidum* Knoch in litt. Length .21 in. = 5 mm. Hab. Atlantic and Gulf States, Ark.

In this species the thorax bears three fuscous lines and each elytron four fuscous lines becoming paler at the suture where the pairs form angles. (Vol. I, Pl. III, fig. 15.)

P. discoideum Lec. S.M.C., No. 264, p. 190. Length .24 in. = 6 mm. Hab. Cape San Lucas.

The thorax is without markings and the elytra bear a large fuscous cloud enclosing a round pale spot common to both elytra.

OBRIUM, Serv.

Contains two species resembling the preceding but differing as stated in table above. The elytra and general color beneath are rufo-testaceous and the surface is punctate and sparsely pubescent.

Head and thorax piceous, coarsely and closely punctate, elytra pale reddish brown, very distantly punctate..... .....?.....**rubidum.**

Body uniformly rufo-testaceous, thorax not closely punctate, elytra more closely punctate (Vol. I, Pl. III, fig. 16)..... .....**rubrum.**

O. rubidum Lec. J.A.P., sec. 2, II, 1850, p. 22. Length .36 in. = 9 mm. Hab. Penn., Atlantic States.

O. rubrum Newn. Ent. Mo. Mag., V, 1838, p. 393. Length .25 in. = 6 mm. Hab. N.Y., Miss., Ohio, Pa., Atlantic States, Canada West.

HYBODERA Lec.

Contains two species of moderate size, distinguished from the succeeding by the finer punctures. The thighs are strongly clubbed; the antennæ slender with scape as long as 2d & 3d joints and joints 3–5 gradually increasing in length. The prothorax is strongly constricted in front, less behind, and the base is as wide as apex; the sides are obtusely angulated and the disk bears four tubercles arranged in a square. They may be known as follows:

Larger species, thoracic tubercles very prominent..... ....**tuberculata.**

Smaller, thoracic tubercles feebly developed.. .....**debilis.**

H. tuberculata Lec. S.M.C., No. 264, p. 191. Length .36 in. = 9 mm. Hab. Oregon, Vanc. (Vol. I, Pl. III, f. 17.)

Color piceous, the elytra with a vague cinereous blotch at base and a broad band behind the middle, seen perfectly in well preserved specimens only. (Pl. III, Vol. I, fig. 17.)

H. debilis Lec. Trans. Am. Ent. Soc., V, p. 66. Length .24 in. = 6 mm. Hab. California.

The color is again piceous and the markings consist of an oblique silvery patch at base and a transverse band behind the middle. This may be only a poorly developed *tuberculata* but the absence of large series prevents the synonymy being perfectly established.

CALLIMUS Muls.

Contains two species resembling the European genus *Cartallum* in form but having the last joint of the palpi cylindrical and the mesosternum very wide and truncate. The hind tibiæ are somewhat curved. The species were described by Dr. Leconte under the generic name *Pilema* but do not differ from *Callimus* and are therefore referred to that genus.

C. ruficolle Lec. S.M.C., No. 264, p. 192. Length .32 to .36 in. = 8 to 9 mm. Hab. California.

Opaque black; thorax shining red, punctured, tuberculate and carinate, basal margin black; elytra flat, punctured and with the sutural angle prominent.

C. cyanipenne Lec. l.c. p. 192. Length .28 to .30 in. = 7 to 8 mm. Hab. California.

Flavo-ferruginous; thorax, ♀ red, ♂ black; head, antennæ, apex of femora, tibiæ and tarsi black; elytra blue, flat and punctured.

MEGOBRIUM Lec.

M. Edwardsii Lec. S.M.C., No. 264, p. 193. Length .50 in. = 12.5 mm. Hab. California.

A species larger than the preceding but resembling them in form. Palpi oval, mesosternum narrow, prothorax longer, lateral tubercle much larger and obtuse. Color testaceous Elytral punctures few, arranged in three lines extending from base to a little behind the middle with a few scattered outside of these lines. The elytra bear an angulated pale band in front of the middle and a few nebulosities behind. (Pl. III, Vol. I, fig. 18.)

CALLIMOXYS Kraatz.

Contains two species readily distinguished from others of the group by the subulate elytra. The thorax of ♂ is more or less red in both species. The color is black except the hind legs which are yellow, the club of the femora only being black. The elytra are somewhat variable, generally brownish with darker margin, and punctured. The species are

difficult to separate and Dr. Horn has kindly communicated the following table to us:

Abdomen almost glabrous.....**sanguinicollis.**
Abdomen rather densely clothed with cinereous, slightly yellow pubescence.....
fuscipennis.

C. sanguinicollis Oliv. Ent. IV, 74, p. 9, t. 1, fig. 7; Chev. Ann. Fr., 1862, p. 257 (Pl. III, fig. 19). Length .40 in. = 10 mm. Hab. U.S., east of Rocky Mts.

C. fuscipennis Lec. Proc. Ac. Phil., 1861, p. 356. Length .40 in. = 10 mm. Hab. California.

MOLORCHUS Fab.

Contains two species with very short elytra, dehiscent and separately rounded at tip. The color is blackish except the elytra which are more or less testaceous. The variability in their coloration has given rise to a considerable synonymy.

SYNOPSIS.

Prothorax narrower, angulated at sides; elytra testaceous..... **longicollis.**
Prothorax broader, rounded at sides; elytra more or less blackish at tip and margin...
bimaculatus.

M. longicollis Lec. S.M.C., No. 264, p. 193. Length .32 in. = 8 mm. Hab. California.

M. bimaculatus Say, J.A.P., III, 1823, p. 428; Newn. Ent., p. 20; *affinis* Lec. Ann. Lyc., I, p. 172, t. 11, f. 12; *obscurus* Lec. J.A.P., ser. 2, II, p. 21. Length .20 to .32 in. = 5 to 8 mm. Hab. U.S., except Pacific Slope.

M. corni Hald., Trans. Am. Phil., X, 1847, p. 45; Lec. J.A.P., ser. 2, II, p. 21, is a variety with the thorax rufous, found in North Carolina and Alabama upon the flowers of *Cornus*.

M. semiustus Newn. Ent. p. 19; Lec. J.A P., ser. 2, II, p. 38, is a variety of *M. bimaculatus* with the greater portion of the surface rufo-testaceous (Pl. III, Vol. I, fig. 20). It occurs at St. John's Bluff, E. Fla.

RHOPALOPHORINI.

RHOPALOPHORA Serv.

This, the only genus of the tribe, contains three species, all slender blackish gray insects with prothorax more or less red. The head is elongate, eyes finely granulate, antennæ slender with 4th joint shorter than 3d and 5th. Thorax variable in form and sculpture. Elytra punctate, flat, suddenly declivous at base. Legs very long and slender, thighs suddenly and strongly clubbed at tip, 1st joint of hind tarsi twice as long as 2d.

SYNOPSIS OF RHOPALOPHORA.

Thorax impunctured.....**lævicollis.**
Thorax punctured.
Thorax broader, strongly bi-impressed.....**longipes.**
Thorax narrower, transversely plicate and rugose.....**rugicollis.**

R. lævicollis Lec. S.M.C., No. 264, p. 193. Length .48 in. = 12 mm. Hab. Texas and New Mex.

Larger than any other species in our fauna and easily known by the impunctured thorax, which is distinctly constricted on the side at base.

R. longipes Say, J.A.P., III, 1823, p. 426; Lec. J.A.P., ser. 2, II, p. 20; Proc. Ac. Phil., VII, 1854, p. 218; *amabilis* Dej. Cat. 3d ed., p. 359; *porosa* White Longic, VIII, 2, p. 206. Length .30 in. = 7.5 mm. Hab. Col., Penn., Kans., Mo., Neb.

The elytra are sometimes armed at tip.

R. rugicollis Lec. Proc. Ac. Phil., 1858, p. 83. Length .38 in. = 9.5 mm. Hab. Texas.

Distinguished from preceding by the form and sculpture of the thorax.

ANCYLOCERINI.

ANCYLOCERA Serv.

This, also the only genus of the tribe contains a single species, a very dainty insect, black with scarlet elytra and abdomen and the long slender legs and clubbed thighs which make the preceding genus conspicuous. The body is slender, head short and prothorax very long compared with the cylindrical elytra. The antennæ are serrate, more noticeably the inner joints, ½ as long as the body in ♀, and longer than same in ♂. The hind pair of thighs is armed with a terminal spine.

A. bicolor Oliv. Ent. IV, 1795, 68, p. 32, t. 3, f. 25; Casteln. Hist. Nat. II, p. 431; *rugicollis* Fab. Syst. El., II, p. 317; Lacord. Gen. Atl. X, t. 93, f. 5; Lec. J.A.P., ser. 2, II, 1850, p. 19; *lividipennis* Hald. Trans. Am. Phil. X, 1847, p. 44.

Length .50 to .70 in. = 12.5 to 18 mm. Hab. Southern States from North Carolina to Texas. (Pl. III, fig. 22, Vol. I.)

PARISTEMIINI.

The characters separating this tribe will be found in the arrangement of tribes, Bull. Br. Ent. Soc., VII, p. 114, or more fully discussed in the Classification p. 294. Two genera are known as under:

Antennæ short, serrate, 11th joint appendiculate..... .....Elytroleptus.
Antennæ longer, slender, 11th joint simple..... ...Holopleura.

ELYTROLEPTUS Duges.

Contains five species formerly known under the generic name *Pteroplatus*. The peculiar form of the elytra shown in the figure (Pl. I, fig. 1) at once distinguishes the genus and the species may be distinguished by the following

SYNOPSIS OF ELYTROLEPTUS.

Black, elytra black with outer margin broadly fulvous.....floridanus.
Black, elytra reddish yellow.....rufipennis.

Scarlet, elytra scarlet with apical fourth black.....**apicalis.**
Scarlet, elytra all scarlet.....**ignitus.**
Ferruginous, posterior half of elytra black.....**divisus.**

E. floridanus Lec. Proc. Ac. Phil., 1862, p. 38. Length .37 in. = 9 mm. Hab. Florida.

E. divisus Lec. Trans. Am. Ent. Soc., XII, p. 23. Length .36 in. = 9 mm. Hab. Texas.

E. rufipennis Lec., l.c. Length .44 to .52 in. = 11 to 13 mm. Hab. Ariz., N. Mex.

E. apicalis Lec., l.c. Length .44 to .68 in. = 11 to 17 mm. Hab. Arizona.

E. ignitus Lec., l.c. Length .44 to .52 in. = 11 to 13 mm. Hab. Arizona.

A full description of the last four species will be found in Dr. Leconte's posthumus writings, cited above, together with notes by Dr. Horn. The exact value of these species is somewhat doubtful and it will require more material to settle the point than is yet accessible.

HOLOPLEURA Lec.

Contains only one species, but that is among the daintiest of the smaller Longicorns. The color of trunk, antennæ, and legs is black; thorax and elytra reddish, sometimes very bright scarlet and always more or less ornamented with blackish spots and vittæ, more distinct in the male (Pl. I, fig. 2).

H. marginata Lec. S.M.C., No. 264, 1873, p. 194; *Helena* ♀ Lec., l.c. Length .32 to .36 in. = 8 to 9 mm. Hab. California.

ROSALIA Serv.

R. funebris Mots. Bull. Mosc., 1845, I, p. 87, t. 2, f. 8; Lec. Ent. Rept., 1857, p. 61, t. 2, f. 11; *alpina* Lec. J.A.P., ser. 2, II, 1852, p. 177. Length 1 to 1.5 in. = 25 to 40 mm. Hab. Pacific Coast to Sitka.

The remarkable black-white coloration of this insect distinguishes it very easily. It is the only representative of the tribe Rosaliini (Pl. I, fig 3).

EVANDA Thoms.

E. xanthomelas Guer. included in Austin's Supplement to Crotch's Check List has not been found within our faunal limits and is to be dropped therefore from our lists.

(To be continued.)*

TO OUR READERS.

In accordance with our custom, the first two numbers are sent to all our old subscribers. No. 3 and the future numbers will be sent only to those who send in their subscriptions to this volume.

* The plate to this paper will be given with the next number.

A generic Synopsis of the Hymenopterous Family Chalcididae.

By L. O. Howard

(Continued from page 219 of Vol. I.)

Subfamily **PTEROMALINAE.**

SYNOPSIS OF TRIBES.

Posterior tibiæ 2-spurred.
  Parapsides of mesoscutum discernible, or indicated anteriorly.
    Abdomen with a more or less distinct petiole, usually long; parapsides discernible anteriorly or complete ..... Tribe **Mischogastrides.**
    Abdomen almost sessile; parapsides complete ..... Tribe **Cleonymides.**
  Parapsides of mesoscutum not at all discernible ..... Tribe **Colotrechnides.**
Posterior tibiæ 1-spurred.*
  Anterior femora enlarged ..... Tribe **Chiropachides.**
  Anterior femora not enlarged.
    Head very large, broad, excavated in front, with two acute tubercles on each side ..... Tribe **Caratomides.**
    Head not especially large.
      Clypeus in the middle at apex acutely 2-dentate; marginal vein of fore wings often thickened ..... Tribe **Sphegigastrides.**
      Clypeus not 2-dentate. Marginal vein not at all or very slightly thickened.
        Wings with a long marginal vein, short stigmal and almost no club ..... Tribe **Diparides.**
        Club always quite pronounced ..... Tribe **Pteromalides.**

Tribe **MISCHOGASTRIDES.**

Mesoscutar parapsides plainly discernible.
  Collar not separated.
  Dorsum convex; parapsides convex.
    Petiole short, or moderately so; left mandible 3-dentate.
      Petiole rugose or smooth; ♂ trophi normal ..... Genus **Lamprotatus** Westwood.
    Petiole punctate, sub-depressed; wings with a very large club.
      Dorsum sericeus-punctate; ♂ trophi normal ..... *Genus **Gitognathus** Thomson.
      Dorsum squamous-punctate; ♂ trophi normal ..... *Genus **Stictomischus** Thomson.
    Petiole very short; both mandibles 3-dentate; club small ..... *Genus **Seladerma** Walker.
    Petiole long; both mandibles 4-dentate; club large ..... Genus **Mischogaster** Walker.
  Dorsum of mesonotum much flatter; parapsidal sutures not deep, posteriorly delicate but complete.
    Metathorax rugose; ♂ antennæ sub-clavate ..... *Genus **Megorismus** Walker.

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* Sometimes 2-spurred in the *Chiropachides* in which case the fore wings are transversely banded with brown. (See synopsis of this Tribe.) Also 2-spurred in the genus *Dimachus* of the Tribe *Pteromalides.*

Thorax short, scutellar furrows almost straight.....
*Genus **Ormocerus** Walker.

Collar separated; parapsides not convex; petiole short.....
*Genus **Toxeuma** Walker.

Mesoscutar parapsides not plainly separated; antennæ with a long scape.

Marginal and postmarginal veins long; ♂ trophi abnormal.....
*Genus **Halticoptera** Spinola.

Marginal and submarginal veins not long; ♂ trophi normal. .....
*Genus **Dicyclus** Walker.

Tribe **CLEONYMIDES.**

Eyes hairy; labrum conspicuous; mandibles rather weak; ring joints of the antennæ large.

Body metallic .....*Genus **Cleonymus** Latreille.

Body scarcely metallic; abdomen sub-rotund; antennæ clavate.....
*Genus **Micradelus** Walker.

Eyes smooth; labrum hidden; mandibles strong; the left 3- and the right 4-dentate.

Scutellar frenum with transverse impressions; head with rounded, convex cheeks...
*Genus **Trigonoderus** Westwood.

Not so; head triangular, narrow anteriorly.

Abdomen sessile.....*Genus **Platygerrhus** Thomson.

Abdomen with a distinct petiole.....*Genus **Photismus** Thomson.

Tribe **COLOTRECHNIDES.**

This tribe consists of the single genus **Colotrechnus* which is sufficiently described in the Synopsis of Tribes for synoptical purposes.

Tribe **CHIROPACHIDES.**

Posterior tibiæ armed with two spurs; wings banded; marginal vein not thickened.

Anterior femora exciso-dentate; posterior tibial spurs arcuate; wings with two transverse bands.....Genus **Chiropachys** Westwood.

Anterior femora simple; wings with but one band; stigmal club large, horizontal...
*Genus **Acrocormus** Foerster.

Posterior tibiæ with one spur.

Marginal veins of fore wings thickened.

Antennæ with the ring-joints large, not transverse; anterior coxæ subcylindrical; stigmal club obsolete.....*Genus **Pandelus** Foerster.

Antennæ with transverse ring-joints; cyaneous.

Stigmal and postmarginal veins short.....*Genus **Metacolus** Foerster.

Stigmal vein longer than marginal; ♀ with antennal club stylate at apex.....
*Genus **Raphitelus** Walker.

Marginal vein of fore-wings not thickened.

Stigmal club very large; anterior border of pronotum sharp .....
*Genus **Dinotus** Foerster.

Stigmal club small or moderately so; anterior margin of pronotum rounded....
Genus **Rhopalicus** Foerster.

Tribe **CARATOMIDES.**

Consists of the single genus *Caratomus* Dalman, a very strange form which can be readily recognized from the characters given in the tribal synopsis.

Family **SPHEGIGASTRIDES.**

Upper wings with a delicate marginal vein, petiole punctate above, longer than broad.

Petiole longer than the posterior coxæ; ♂ palpi normal.

Head with compressed cheeks; vertex not very narrow.

Parapsides discernible..... .....*Genus **Merismus** Walker.

Parapsides not plainly discernible.

Abdominal joints 2 and 3 very large ..*Genus **Sphegigaster** Spinola.

Abdominal joint 2 very large, others short, often retracted.....
*Genus **Cryptoprymnus** Foerster.

Head with rounded cheeks, sub-lenticular, vertex narrow; postpetiole very large; collar broad.....*Genus **Syntomopus** Walker.

Petiole not longer than posterior coxæ; second segment of abdomen deeply emarginate and third very large; ♂ palpi abnormal.

Vertex acute in the middle; parapsides not plainly discernible.....
*Genus **Cyrtogaster** Walker.

Vertex not acute medially; parapsides plainly discernible. .....
*Genus **Polycystus** Westwood.

Upper wings with a thick marginal vein; petiole shorter than the posterior coxæ.

Parapsides plainly separated; stigmal club large.....*Genus **Pachycrepis** Foerster.

Parapsides not plainly distinguished.....Genus **Pachyneuron** Walker.

Tribe **DIPARIDES.**

Petiole shorter than posterior coxæ; ♂ antennæ not verticillate-pilose.....
*Genus **Panstenon** Walker.

Petiole linear, longer than coxæ; postpetiole very large; ♂ antennæ with well separated joints, sparsely verticillate.....*Genus **Dipara** Walker.

Tribe **PTEROMALIDES.**

Posterior tibiæ 2-spurred . .....*Genus **Dimachus.**

Posterior tibiæ 1-spurred.

Antennal club subulate ♀, or conico-acuminate ♂; metathorax punctate, no fold and no spiracular sulcus ....Genus **Merisus** Walker.

Antennal club not subulate.

Antennæ inserted below the middle of the face; stigmal club scarcely discernible; vertex not medially acute; cheeks round; abdomen not rotund; left mandible 3-, right 4-dentate; joint 1 of the antennal funicle equal to the others in size, rarely abruptly smaller.....Genus **Eutelus** Walker.

Terebra exserted; funicle of antennæ thick, joint 1 in the ♀ abruptly smaller; thorax above smooth; metathorax very short.....
Genus **Roptrocerus** Ratzeburg.

Joint 1 of the antennal funicle most usually large, very rarely abruptly smaller than the others; posterior coxæ not pubescent on the hind margin at base; left mandible usually 3-dentate, dentations broad at base.....
*Genus **Aetroxys** Westwood.

Anterior margin of the collar sharp, acutely reflected; mandibles acutely 4-dentate.....*Genus **Isocyrtus** Walker.

Head with the vertex sometimes medially acute; eyes occasionally hairy; mandibles usually 4-dentate; antennæ often inserted below the middle of the face; ring joint plainly discernible; metathorax usually punctulate and furnished

with a carina; abdomen often rotund, never produced at apex with ♀.....
Genus **Pteromalus** Swederus.

Mandibles with three acute strong teeth; collar narrow, scarcely discernible.....
Genus **Metopon** Walker.

Genus **DIMACHUS.**

Collar not separated; funicle filiform, joint 1 large.

Marginal vein thickened, stigmal nearly same length or a little longer; body short...
Subgenus **Cænocrepis.**

Marginal vein delicate, longer than stigmal.

Abdomen with a basal yellow band.....Subgenus **Dimachus.**

Abdomen with no band.....Subgenus **Hemitrichus.**

Collar separated.

First funicle joint short.

Antennæ short, clavate .....Subgenus **Habritus.**

Antennæ filiform.....Subgenus **Dinarmus.**

First funicle joint cylindrical; antennæ filiform.....Subgenus **Picroscytus.**

Genus **MERISUS.**

First funicle joint short; rim of the metathorax with large punctures; coxæ all rufous
..... Subgenus **Bœotomus** Foerster.

First funicle joint as long as the following.

Abdomen subcylindrical, joint 3 short.....Subgenus **Merisus** Walker.

Abdomen subovate, dorsum often flattened.....Subgenus **Homoporus** Thomson.

Genus **EUTELUS.**

Marginal vein one and a half times as long as the stigmal; metathorax with distinct lateral folds; club of ♂ antennæ blackish.

Head with narrow vertex; ♀ ocelli placed in a very slightly curved line; thorax short.....Subgenus **Eutelus** Walker.

Head with broad vertex; clypeus incised or truncate at apex; ocelli large; placed in a triangle; thorax long; margin of collar sharp; abdomen elongate, triangular.....Subgenus **Platytermus** Thomson.

Marginal vein not at all or bnt slightly longer than stigmal; metathorax with no lateral folds; first funicle joint very small; vertex and collar narrow.

Antennæ inserted a little below the middle of the face.....
Subgenus **Amblymerus** Thomson.

Antennæ inserted slightly above the clypeus; metathorax very short.....
Subgenus **Psilonotus** Thomson.

Genus **ROPTROCERUS.**

Antennæ inserted almost in the middle of the face which is impressed with large punctures.....Subgenus **Roptrocerus** Ratzeburg.

Antennæ inserted scarcely above the clypeus.....Subgenus **Anogmus** Foerster.

Genus **ÆTROXYS.**

Clypeus armed apically in the middle with a tooth; thorax long, collar acutely margined and dilated laterally; metathorax with short folds or none at all.....
Subgenus **Stenomalus** Thomson.

Clypeus with no apical tooth, but with a sinuate or truncate apex.

Wings with a large stigmal club; head with the cheeks often rounded; collar separated, acute and not narrow medially.

Metathorax short; clypeus incised in the middle at apex; mesothoracic episterna reaching to coxæ.....Subgenus **Cecidostiba** Thomson.

Metathorax not short, often with a fold and often also with a slight transverse carina; head and thorax usually rigido-pubescent.....
Subgenus **Cœnacis** Foerster.

Wings with a small or medium-sized stigmal club; head often triangular and with prominent eyes; collar often not at all or slightly separated.

Head triangular, narrowed towards mouth, face not rigido-pubescent; eyes large, convex, round; præsternum large; mesosternal groove distinct; the round spiracles remote from postscutellum.

Collar acute.

Vertex acute in the middle.....Subgenus **Ætroxys** Westwood.

Vertex not acute in the middle.

First funicle joint small.....Subgenus **Cricellius** Thomson.

First funicle joint large.....Subgenus **Holcæus** Thomson.

Collar not separated.....Subgenus **Stinoplus** Thomson.

Head usually with bulging cheeks; eyes not prominent; sternal groove obsolete; vertex in the middle not acute; metathoracic spiracles usually large, oval; collar not at all or slightly acute; first funicle joint longer than pedicel.

Collar broad; head with bulging cheeks; left mandible 3-dentate.....
Subgenus **Habrocytus** Thomson.

Collar narrow in the middle; head narrowing towards mouth; both mandibles 3-dentate.....Subgenus **Spintherus** Thomson.

Genus **ISOCYRTUS.**

Eyes hairy; metathorax long, its apical border with large punctures; abdomen with its second segment smooth at base, the third not small.....
Subgenus **Isocyrtus** Walker.

Eyes smooth; second abdominal segment with a dense fringe on sides, not large; third small.

Vertex broad; head short, thick, eyes round and prominent; funicle of the ♂ antennæ alternately white.....Subgenus **Polycelis** Thomson.

Vertex not broad, eyes sub-ovate .....Subgenus **Trichomalus** Thomson.

Genus **PTEROMALUS.**

Eyes hairy; antennæ incrassate; vertex sharp in the middle.

Wings maculate; ♀ abdomen short, ovate; tibiæ with rigid bristles.....
Subgenus **Halizous** Thomson.

Wings immaculate; abdomen rotund.....Subgenus **Trichoglenus** Thomson.

Eyes smooth.

First funicle joint small.....Subgenus **Meraporus** Walker.

First funicle joint large.

Metathorax with a large sub-globose neck; flagellum of antennæ filiform; ♀ abdomen ovate-acute; postmarginal vein longer than stigmal.

Wings entirely pubescent; head with concave cheeks; neck of metathorax smooth.....Subgenus **Catolaceus** Thomson.

Wings with a large clear spot; neck of metathorax punctate.....
Subgenus **Pteromalus** Swederus.

Metathorax usually with a very small neck; postmarginal vein often shorter than stigmal, very rarely longer; ♀ abdomen usually rotund.

Postmarginal longer than stigmal; neck of metathorax short; abdomen oval-rotund; vertex broad.....Subgenus **Diglochis** Thomson.
Postmarginal shorter than stigmal or equal to it.
Abdomen oblong.
Vertex rounded in the middle, ♀ abdomen ovate, convex below; ♀ wings often marked with large smoky discs; club of ♀ antennæ small, shorter than pedicel.....Subgenus **Arthrolytus** Thomson.
Vertex acute in the middle.....Subgenus **Dibrachys** Thomson.
Abdomen rotund; cheeks compressed, acute; wings hyaline, postmarginal shorter than stigmal.....Subgenus **Cœlopisthus** Thomson.

Genus **METOPON.**

♀ antennæ strongly incrassate, sub-clavate; ♂ antennæ verticillate-pilose.....
Subgenus **Metopon** Walker.
♀ antennæ with the flagellum of equal width throughout, ♂ antennæ pubescent or densely clothed with short hairs; ♀ abdomen rotund.....
Subgenus **Dirhicnus** Thomson.

(To be continued.)

Notes on Thelyphonus *Latr.*

By Geo. Marx, m.d.

There is a group among the *Arthrogastra*, to which Latreille has given the name *Pedipalpi*. This term can be interpreted in two ways, either, the palpi are like legs, or the legs are like palpi. "*Palpi brachia æmulantes*", says Latr., "the palpi resemble arms". If he had intended to introduce this idea into the name, he should have called the group *Brachiopalpi*. But he was correct in naming it *Pedipalpi*, for the anterior pair of legs are here functionally no motor organs; but their strucrure and insertion prove that they are the, here retained, 2nd maxillary or labial palpi of the insects, which are transformed in all other *Arachnida* into leg-like structures with motor functions, giving thus the whole class the characteristic 8 legs, and which are here exceptionally preserved in their original form.

While the insertion of the 8 legs in all *Arachnides* is on one plane, either in close apposition or radiating from the sternum, we find in the *Pedipalpi* at their sternal surface only 6 coxæ surrounding the sternal plate and the insertion of the first pair is at the pleural side and in the upper outer border of the maxillæ.

The difference in the structure between the anterior and the other 6 legs is remarkable. The former are not half as thick, but at least twice as long as the latter. The tibia represents in the other six legs one joint (in *Phrynus* sometimes two and three) while it has in the front pair—at least in some—27 to 37 joints, and the tarsus 8, 65, or even as many as 85, when it has in the other 3 pair only 3 joints.

Latreille divided the *Pedipalpi* into 2 genera: *Phrynus* and *Thelyphonus*. Since then numerous species have been collected and new genera have been proposed. Koch establishes for the genus *Thelyphonus* the family *Urotrichi* or Whiptails and Karsch for *Phrynus* the family *Tarantulæ* with the genera *Phrynichus*, *Tarantula*, *Damon* and *Charon*.

Lucas described in his monograph 7 species of *Thelyphonus*, amongst which is *T. giganteus* which is found quite frequently in the Southern States, where it is much feared by the people who call it Nigger Killer, Mule Killer, Grampus, etc. Girard found a new species in the collection of the Red River Expedition 1852, which he called *Thelyph. excubitor*, and for which he gave no locality. This species seems to be very rare, for it is mentioned nowhere since in print, nor have I ever seen more than one although more than 20 specimens of *giganteus* came under my observation. This one is in my own collection and was received some time ago from Texas with a number of specimens of the other species.

In examining this little collection I found the following interesting facts: 1, that *excubitor* is the male of *giganteus*; 2, that they have not as stated by all authors hitherto, 8 eyes, but 12; 3, that they are perfectly harmless as they possess no poison glands in their mandibles. The reasons for this assertions are: 1. The structural differences between both species are exactly such, as are found between the sexes of the scorpions: viz. in the male the tail and the palpi are longer and the abdomen more tapering toward the apex. There is no other difference in structure found. In opening the abdomen of two *giganteus* I found them filled with eggs or remnants of such, which was not the case in examining the abdominal cavity of *excubitor*. The external opening of the sexual organs present a great difference of structure, for while in all *giganteus* the vulva appears as a closed bursa the sexual orrifice in *excubitor* is not closed but represents a slit, divided vertically by a bar with two arch-like prominences. 2. The fact that 2 eyes on each side have hitherto escaped the notice of naturalists, has for its reason, that they are extremely small in comparison with the three large eyes between which they stand. Beside the two anterior ocelli which stand in the median line near the clypeus, there is on each side of the cepha'x and further back than the front eyes, a tubercle upon which these 5 ocelli are situated: one small one at the tip of the tubercle, one large one at its external side and one of medium size at the posterior slope. Between these two latter ones are two very small ocelli, the anterior of which stands a little higher than the posterior one. These small ocelli are quite distinct and shine with the same bright amber color out of the nearly black background of the tubercle. 3. That they have no poison gland in the mandibles, I can only prove by the absence of

orifice in the terminal mandibular claw, which would occur here as well as in all other *Arachnida* which have a poison gland in their mandibles.

But they have another weapon, useful only for defense; for they can emit a sharp and penetrating odor very much like acetic acid. The inhabitants of some West India Islands therefore call them "Vinaigrier" or vinegar maker. Where that odor gland is situated in the body of *Thelyphonus* I am unable to say as my studies were confined only to dried specimens.

EXPLANATION OF PLATE.

Fig. 1. *Thelyphonus giganteus* Latr. male (*Thel. excubitor* Girard).
Fig. 2. *Thelyphonus giganteus* Latr. female.
Fig. 3. Sternal surface of the female.
Fig. 4. Lateral eye eminence with the five eyes.
Fig. 5. Front showing the mandibles. All the mouthparts are hidden under a thick pubescence and these hairs have been removed to show the mandibles and maxillæ.
Fig. 6. Front from the side.
Fig. 7. Abdomen of the male, showing the sexual orifice.
Fig. 8. The mandibles separated. *a* from the inner side; *b*. from the outer side.
Fig. 9. On organ of special sense, situated at the tibia of each leg.

Remarks on North American Scolytids.

By E. A. Schwarz, Washington, D.C.

Gnathotrichus materiarius. Dr. Packard in his *Guide*, p. 493, (see also Bull. 7, U.S. Ent. Comm., p. 174) states that "a species, probably the *Cryphalus materiarius* of Fitch" has been found to bore into empty wine casks and spoil them for use. This is undoubtedly a confusion of species, as *G. materiarius* lives exclusively in pine trees. The species in question was probably *Xyleborus fuscatus* which, in my experience, bores in several kinds of deciduous trees.

Gnathotrichus asperulus is perhaps not rare; but not easily recognized. It bears a close resemblance to the smaller and rubbed specimens of *Pityophthorus minutissimus*, from which it differs mainly by vestiture of the antennal club. I beat two specimens from *Pinus inops* near Washington in May. In this tree it will probably be found boring in the same manner as *G. materiarius*.

Pityophthorus. The first group of this genus (Leconte's group B), at once recognizable by the fine and dense punctuation of the elytra, includes a few easily distinguished species, infesting deciduous trees. The sexual differences seem to be alike in all species. The second group (Leconte's group C), divides naturally into two sections: In the first the elytral declivity is dissimilar in the two sexes. The three species which

comprise this section (*X. carinulatus*, *sparsus* and *plagiatus*) are readily distinguished and live under bark of pine trees. They constitute a series which is strikingly parallel with that formed by the European *Tomicus chalcographus*, *bidens* and *4-dentatus*, and since Mr. Eichhoff (Europ. Borkenkäfer, p. 23), states that the first of these occurs also in North America, he probably refers to our *P. sparsus*. However, a comparison of specimens is necessary to establish the identity. The second section in which the elytral declivity is alike in both sexes comprises numerous species, mostly living on Conifers, and which are extremely difficult to distinguish. To one of those with nearly regularly punctate-striate elytra (probably *P. hirticeps*) belongs Fitch's *Tomicus minutissimus*.

Xyloterus bivittatus. Mr. Eichhoff (l.c., p. 299) cites this as a synonym of the European *X. lineatus* Oliv,, and I think that he is right. His *X. vittiger* (l.c., p. 298), described from California, is undoubtedly only a color variety of the same species.

Xyleborus pyri. The male still remains unknown, but from analogy with the European *X. dispar* I strongly suspect that the species described by Leconte as *obesus* will prove to be the male of *pyri*.

Xyleborus retusicollis. I have seen a female of this rare species in Mr. Ulke's collection. It agrees with the male in size and sculpture of the elytra but has the thorax anteriorly slightly flattened and not excavated.

Xyleborus xylographus Say. Under this name Dr. Fitch in his 4th Report, p. 30, describes a Scolytid boring under the bark of pine. His description is not cited by Zimmermann nor by Leconte, but his very careful article on the life habits of the species is copied by Dr. Packard in his Bull. 7, U.S.E. Comm., p. 163. A glance at Fitch's description plainly shows that he was mistaken in the identification of the species and that he had before him what is now known as *X. cœlatus* Eichh. Moreover *xylographus* belongs to a group of species which do not live under bark, but enter the solid wood. *X. Saxeseni* Ratz. is said by Eichhoff (l.c., p. 280) to occur in North America a d this could only be identical with *xylographus*. Say's name however would have priority.

Xyleborus pubescens. Among a large colony of this beetle which I found boring into *Pinus inops* near Washington, I discovered two specimens of the male. It is only one-third the size of the largest female, the elytral striæ are finer, the tubercles at the declivity smaller, the thorax much shorter, not longer than wide, anteriorly much more suddenly rounded and distinctly depressed. The difference in general appearance between the two sexes is very striking.

Xyleborus punctipennis. In the male the head is covered with very long but not dense hair and the elytral declivity is less impressed than in the female. This sexual character is quite exceptional in this genus and but for the structure of the antennal club this species would be referred to *Pityophthorus*.

Dryocoetes septentrionis is synonymous with *D. autographus* Ratz. as correctly stated by Eichhoff (l.c., p 262).

Cryphalus rigidus. What Leconte (Rhynchophora of N. Am., p. 362) describes as the male I take to be the female. Two specimens from Detroit, Mich., which I consider as males, have the head deeply retracted in the thorax so that its sculpture cannot be seen; but the first antennal joint is fringed with a double row of long pale hairs as in certain species of *Micracis*.

Cryphalus jalappæ. Mr. Henshaw in his Check List wrongly places this in the genus *Coccotrypes*. To the latter genus belongs *Bostrychus dactyliperda* Fabr., which, according to Eichhoff, lives in dates and Areca nuts and which has been widely distributed with these two articles of commerce.

Xylocleptes. Mr. Eichhoff (l.c., p. 23) states that *X. bispinus* occurs in North America. The species is easily recognizable but I have seen nothing similar in our collections and suspect a confusion of localities. It bores in the stems of *Clematis*. *X. cucurbitæ* lives in the vines of Wild Gourd, and *X. decipiens* will no doubt also prove to have similar habits, as the numerous specimens I collected in Michigan and near Washington always occured on low plants. I have failed heretofore to discover the real food plant. *X. concinnus*, on the contrary, is stated by Mannerheim to live under pine bark.

Tomicus sexdentatus according to Eichhoff (l.c., p. 213) occurs in North America; but the statement is probably based upon a wrong locality.

Tomicus montanus Eichh. (l.c., p. 219) from California is synonymous with *T. confusus*.

Tomicus mucronatus Lec, of Henshaw's Check List is apparently a duplication of *Cryphalus mucronatus* and should be stricken off.

(To be continued.)

Notes and News.

We have received from Mr. Scudder a circular announcing the near completion of his work on the New England Butterflies, and giving a list of desiderata in the way of early stages for illustrations. The list is

too long to reprint, but if any of our readers who may be in the position to aid Mr. Scudder will write to him, we doubt not that he will receive the list by return mail. Almost anybody can do something in this way, and we hope that Mr. Scudder will succeed in securing an abundance of the desired material.

Book Notices.

New Genera and species of Californian Coleoptera. By Thos. L. Casey, Lt. Eng'rs. Bull. Cal. Ac. Sci., Vol. I, pp. 283—336, 1 pl. Dec. 15, 1885.

Describes 31 species of Staphylinidæ, mostly belonging to the Aleocharini, with the new genera *Colusa* with five species (all new), *Pontomalota* with three species (*Phytosus opacus* Lec. and two new), *Platyusa* with one species, *Bryonomus* (for *Cafius canescens* Mann. and *C. seminitens* Horn) and *Vellica* (*Homalini*). Describes also three species of *Actidium* (*Trichopterygidæ*), *Euscaphurus saltator* (n. gen. et sp. Dascyllidæ) *Cœnocara occidens*, (Ptinidæ), *Platycerus californicus* (Lucanidæ) and *Polyphylla marginata* (Scarabæidæ).

In attacking the *Aleocharini*, Lt. Casey ventures into an unexplored field, where he is comparatively safe from making synonyms, because most of the species from the Pacific Coast are undescribed. It is to be hoped however, that Lt. Casey will not confine his work to mere descriptions; but will take up some of the groups systematically.

The Butterflies of the Eastern United States. For the use of classes in Zoology and private students. By G. H. French, A.M. Phila. Lippincott & Co., pp. 402, ff. 93.

This is a neat work, in its get up; but rather disappointing in its contents. It should have been supposed that for the use of students, or as a text book, there should be some explanation of the basis of classification. There is nothing of this. The genera are not described at all except in the "Key", in which the most superficial characters are used. The sub-families are but little more fully defined, and the families are in much the same position. The species are rather fully described, and the book obtains its value from being a compilation of descriptions of species, with figures enough to guide the user with considerable certainty to the insect he desires to name. An intelligent student can probably name all his species from the Eastern United States, but when through with his work would have no more idea of classification than could be gathered from Harris or Packard. The work is a disappointment. The classification, putting the *Papilionidæ* at the head, is perhaps not subject to criticism in a work of this kind; but some mention of the differences of opinion on this subject might have been profitably made.

The Sphingidæ of New England. By C. H. Fernald, A.M., Orono, February. 1886. Sprague & Son, State Printers. 8°, pp. 85, pl. VI.

A handy little pamphlet giving a very complete account of the New England Sphinges in a concise, clear and accurate form. The larvæ, where known, are described and the food plants are given. There is a Synoptic Table covering genera and species, and then the genera and species are described in detail; the author relying upon his own observation for the generic characters. It is a very practical little book, and one that will be of great help to the student that desires not only to get names for his insects but to the learn something of their structure. The work is a companion to the "Butterflies of Maine" and as in that work the pronounciation of the specific and generic names is given.

Society News.

Brooklyn Entomological Society. April 6th, 1886. — Eight members present, the President in the chair. Mr. Linell exhibited a living specimen of *Zopherus mexicanus*, remarking on the extreme tenacity of life exhibited by the specimen. He had tried to kill it in a variety of ways, and for the past eight days it had lived in a strong, freshly prepared cyanide bottle. Mr. Hulst made some further remarks on methods of obtaining eggs of Geometridæ, and Mr. Weeks explained some of his methods for raising larvæ which fed on small, low plants. Mr. Hulst exhibited a portfolio of colored drawings of larvæ (principally Bombycidæ), and their food plants, made by Miss Emily L. Morton of Newburgh, N.Y., which were pronounced extremely natural and recognizable at a glance.

Entomological Society of Washington. April 1, 1886. Mr. Schwarz made some remarks on the synonymy and biology of various Scolytids. He exhibited a specimen of the work of *Monarthrum mali* in Red Oak and explained the nature of the main gallery made by the parent beetle and that of the branching galleries apparently made by the larvæ. He also spoke on the work of a large colony of *Xyleborus pubescens* which he found in the solid wood of *Pinus inops* and exhibited the hitherto undescribed male of that species. Mr. Smith called attention to some features in the structure of the *Saturniidæ*. The family as he proposes to limit it, has the following characters. Two branches to each joint of the antennæ in the ♂; no tongue; retracted head; short palpi; plump body; hind legs short and weak; tibiæ without spurs; tarsi without spines; no frenulum; veins not more than 11, usually 10. The *Attacinæ* have the antennæ pectinated to the tip in both sexes. Except in *Telea* and *Actias* the discal cell of both wings is open. He considers that *Samia*, *Platysamia*, *Philosamia*, and *Callosamia* are all congeneric, and explained the differences and agreements between them. In *Hyperchiria io* the antennæ are as in *Attacus*; but simple, or only serrate in the ♀. In the *Ceratocampinæ* the pectinations never extend to the tip; the ♀ has the antennæ simple, except in *Adelocephala bicolor* in which they are pectinated as in the ♂, except that there is only a single branch to each joint of the antennæ. The discal cells are always closed, and the differences in venation of the species was pointed out.

ENTOMOLOGICA AMERICANA

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Notes on two larvae of the genus Catocala.

By D. S. Kellicott.

C. obscura. The larva of this species feeds on the leaves of the shag-bark Hickory, *C. alba*, and in habit agrees very closely with other described species of the genus; it is, apparently, a night-feeder, concealing itself by day at rest under the loosened bark of the tree upon the leaves of which it feeds at night. July 5, 1883, at Pulaski, N. Y., larvæ were taken from beneath the bark of the hickory, and from these, two imagos were obtained. Two sizes were thus obtained on that day: one, evidently soon after its last larval moult, measured 1.6 in., width of head .17 in., of eighth and ninth rings .2 in.; the smaller ones were 1.1 in. long, they moulted July 19, when they were 1.5 in. long and precisely similar to the larger size when taken July 5th.

The head is somewhat flattened, reticulated with coarse, uneven lines and a heavy black stripe extends along the lateral borders from the articulation of the mandibles half way to the apex of head lobes. In this character it closely resembles the larva of *C. retecta* which likewise feeds on the hickory, The antennæ are long, slender and white.

The color of the skin is dark gray, much darker than in *retecta*. The piliferous spots which are arranged nearly at the corners of a rectangle are large and light colored; these are larger than usual in rings five and twelve, otherwise there are no humps; there are no lateral fringes as in *Ultronia* and *Unijuga*. The dorsal line is very obscure; there are on rings five, nine and ten, irregular black crosses; the stigmatal line distinct and black. The stigmata are of the usual shape, the long axis, however, leans slightly forwards, rings black, white within. The ventral surface is pinkish with black spots in the abdominal rings except eight and nine. The color of smaller specimens yellowish gray. One larva

then 2 in. in length spun the usual, light, very loose cocoon among the leaves July 20th; the imago appeared about August 15. The pupa was of the usual form and color covered with bloom; it measured 1.1 in. The anal hooklets unusually long.

C. habilis. The larvæ of this species were in company with those of *obscura* mentioned above. Different sizes were taken; but slight changes in color or ornamentation was noted at the moults. This larva is quite different from any of the genus heretofore identified by me.

An average mature caterpillar measured 2 in. in length; slender, color dark, in some almost black, skin shining. Along the dorsum there is a broad stripe lighter than the general hue, on either side a darker one of equal width; the stigmatal stripes almost black; beneath pale whitish with black spots on the middle segments. Head reddish black with faint reticulations in white.

Pupated in the usual cocoon, the first to change July 18 gave a moth August 18.

A CORRECTION.

In Papilio, Vol. I, p. 141, I described the larval characters of *C. retecta* as those of *C. flebilis*. The mistake was made by comparing my moth with a rather diffuse specimen of *retecta* in the Harvey collection of moths now in the Buf. Soc. of Nat. Sci. labeled "*flebilis*". As Mr. Grote had seen this collection I supposed it approved by him and correct. It was not and I correct my error by saying that what is said in the paper cited under *C. flebilis* refers to *C. retecta*.

Mr. Geo. P. Welles, of Chicago, writes:—Has it ever occurred in your experience, that certain species were local within extremely narrow limits? I gathered *Blethisa quadricollis* under one stone during eight or ten successive days, and never anywhere else. Also *Omophron robustum* under one particular chip, and in no other place. I have taken 50 *Toxotus Schaumii* from a little bush year after year and never one two feet from there, except the first one I ever caught, which I took from the mouth of a big *Asilus* which came flying towards me."

These local occurrences are of extreme interest. Several such have occured in my experience, notably in *Tetraopes canteriator*, for which I know two small localities on Long Island where I can get them year after year with absolute certainty; but though there is an abundance of their food plant all about, they never leave these small patches.

J. B. S.

Notes upon various species of the Ennominae.

By Geo. D. Hulst.

Oxydia vesuliata Cr. This species has been taken in Southern Florida. The specimens differ in no respect from those received from Brazil. It is the largest Geometer of our fauna, expanding 75 mm.

Urapteryx politiaria Cr. To specimens of this taken in Florida, Mr. Grote gave the varietal name of *floridata*. The Florida specimens seem to vary very little, and where a stretch of sea or a range of mountains intervenes slight differences may be of even specific value. But specimens of *U. politiaria* from Brazil are taken in numbers, the exact counterparts of the Florida form.

Ripula virginaria Hulst. One of the most beautiful of Geometers, and the first of its genus in our country.

Eutrapela transversata Dru. This species is very variable in the color and shape of its wings. It undoubtedly includes in its reach not only the many forms given names by Guenee and Walker, but as well the species Guenee called *C. incurvata* and *C. tetragonata*. The only individual difference in the latter is the cross striations at the base of the tail. The cross line is found in every variation.

In all collections that have come under my notice, the ochreous form is labelled var. *goniata* Guen. According to Dr. Packard, *goniata* is the fawn colored form, and is a synonym of *transversata* Dru. The variety name of the yellow form is *transpositata* Wlk.

Specimens from the South are generally less angulated than those from the North, and are often of the variety *incurvata* Guen., having no angle on outer margin of fore wings.

Eutrapela clemataria Ab. & Sm. There is considerable variation in this insect, especially in the female. One form, generally from the South, is lighter in color, with the apex of fore wings more pointed and very much extended. This is, I believe, the true *E. clemataria* Ab. & Sm. The darker form is var. *transducensata* Wlk. This species also varies very much in the amount of undulations on the outer margins. Generally very prominent, the undulation is sometimes hardly perceptible.

Tetracis truxaliata Guen. Differs much in the size of specimens, ranging from 30 to 60 mm.

Tetracis cervinaria Pack. This is one species in my opinion with *T. aurantiacaria* Pack., the former being the ♂, the latter the ♀ form. The sexes are much more distinct than is usual in this subfamily. The

♂ was first described, and the name of the species becomes *T. cervinaria* Pack.

Tetracis simpliciaria Grt. This is a lighter colored form of *T. paralleliaria* Pack., and may be retained as a variety name. For determination of *T. paralleliaria* Pack., see remarks under *T. mellitularia* Hulst, Ento. Am., Vol. I, p. 202. For information concerning Dr. Packard's type in the Museum of Comparative Zoology as well as for other favors, I am indebted to Dr. H. A. Hagen of Harvard University.

Drepanodes olyzonaria Wlk. According to Packard who saw Walker's type and knew Grote's species this is probably the species afterwards called *D. varus* by Grt. and Rob. Walker fairly well describes the species which is very variable and we think ourselves justified in using his name. The species includes *D. sesquilinearia* G. and R., *D. æquosa* G. and R., and *D. juniperaria* Pack., the first two being perhaps allowable as varieties. It is difficult sometimes to separate this species from *D. puberaria* G. and R., and *D. perizomaria* Hulst.

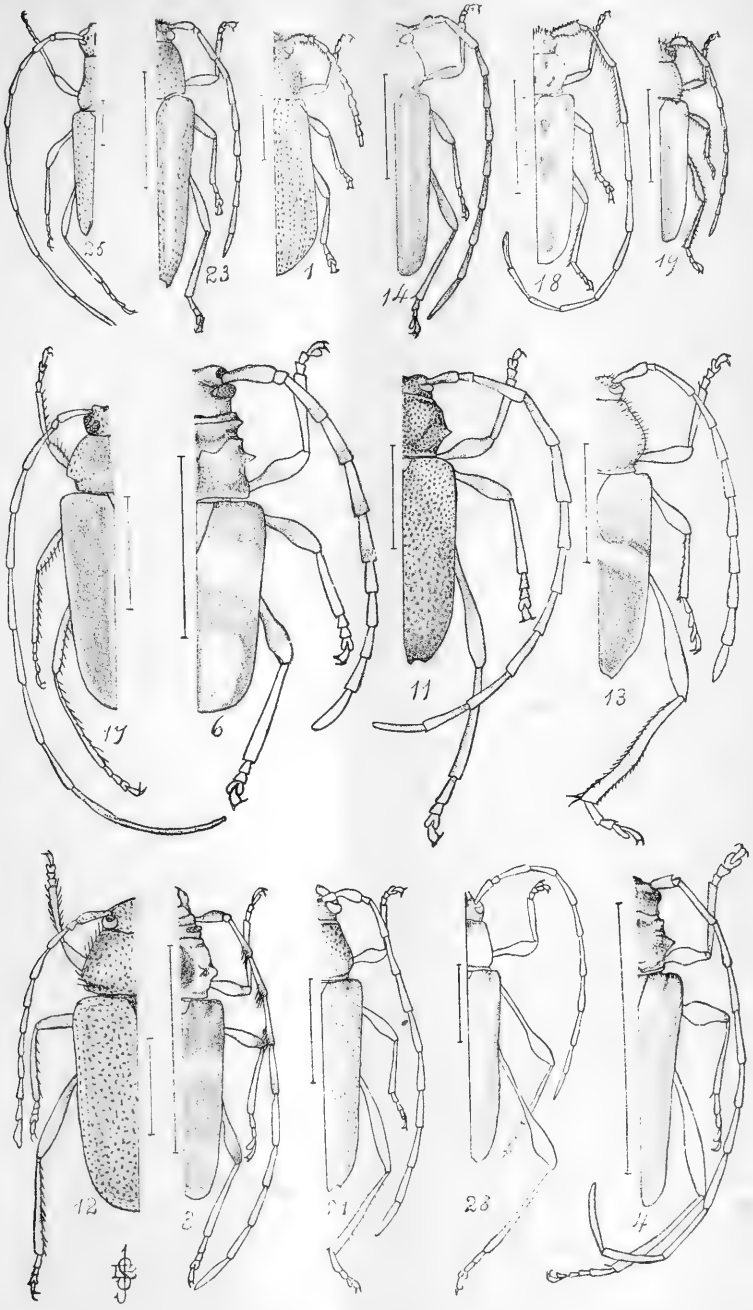
Sabulodes dositheata Guen. Mr. A. G. Butler in "Some Notes on some N.A. Lepidoptera" (Papilio, Vol. I, p. 220), gives from British Museum types and specimens. a synonomy of this species which we have been accustomed to know as *Tetracis ægrotata* Guen.

The synonomy is as follows:

Sabulodes dositheata Guen.
" *columbiata* Guen.
Tetracis ægrotata Guen.
Choerodes atropesaria Walk.
" *subclararia* Walk.
" *punctata* Pack. MSS.

This is pretty good for an insect which varies less than is usual, though the ♀ is ordinarily larger and lighter colored than the ♂, and has the wings more angulated. The insect, (if the genus be a valid one), is the first of its genus in our fauna.

Caberodes confusaria Hub. I accord this species the palm for variability. It has been given five different names by Guenee, and two more by Walker after recognizing Hübner's and all of Guenee's. Its name was well chosen by Hübner. I have specimens before me ranging from 32 to 62 mm. in expanse; ranging from bright yellow through light ochre to dark brown in ground color; ranging from wings evenly rounded to wings strongly pointed, falcate and angulate. In variation of bands and border, color and wing shape it grazes on *C. antidiscaria* Wlk., and seems to intergrade with *Eutrapela falcata* Pack.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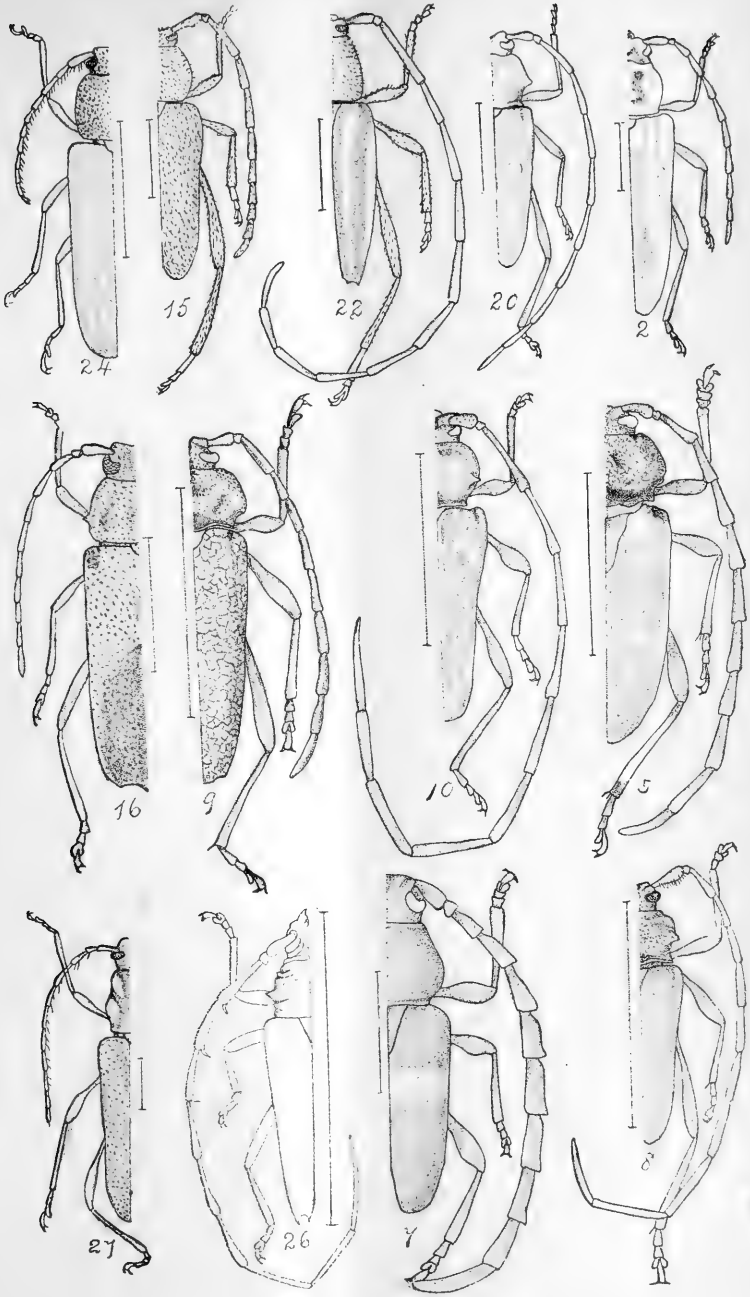
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Caberodes antidiscaria Wlk. I have one specimen only of this, but have no doubt it is a good species.

Eugonia vidularia Grt. This is a synonym of *Tetracis grotearia* Pack. It differs in no respect from the ordinary ♂ form, though it is a trifle lighter in color than the type.

Eugonia magnaria Guen. This species has for some years back been pretty universally looked upon as being a synonym of a European species. It ordinarily goes by the name *E. alniaria* Linn., but as Mr. Möschler shows, *E. autumnaria* Wernb. is the species it most resembles, and of this he believes it a synonym. As yet I hold it to be a valid species. I have examined several specimens, and find the American differs structurally from the European. In the venation of the fore wings, both the European species have a subcostal and two accessory cells. The American has a subcostal, but no accessory cells. On this ground I retain Guenee's name for our species.

Azelina hubnerata Guen. A close contestant with *Caberodes confusaria* Hüb. in variability. I do not know how many tropical forms named by Guenee, Walker and others may be included under this species, but in the range of American material it includes *A. stygiaria* Wlk., *A. honestaria* Wlk., *A. behrensata* Pack., *A. morrisonaria* Hy. Edw. and perhaps *A. zalissaria* Wlk. It includes forms with wings angulated and unangulated, undulating on outer margins and without undulations, with median space very broad and with lines almost coalescing, with color varying through black, reddish, brown, and cinereous.

Azelina zalissaria Walk. This seems to be very distinct from *A. hubnerata*, but curiously enough, all the specimens I have seen have been females.

Azelina arizonaria Hy. Edw. Of this *A. albomacularia* Hy. Edw., is a variety.

Endropia textrinaria Grt. This seems to me to be a good species, though Mr. Grote, probably unintentionally, left it out of his last Check List 1882.

Endropia warneraria Harvey. As Mr. Grote has observed, this is the same as *E. apiciaria* Pack., and is the name of the species, as it antidates the latter. I have seen no specimen in the various collections of *E. pilosaria* Pack. From Dr. Packard's description the only material difference is in the shape of the hind wings. But in view of the difference in this respect of the two sexes of *E. warneraria*, I am inclined to believe *F. pilosaria* is not a distinct species The two species are at any rate very near to each other.

Endropia homuraria G. and R. Dr. Packard places this as a synonym of *E. duaria* Guen. But Mr. Grote, (Can. Ent. IX, 89 and Papilio II, 100), with considerable feeling and logic, protests against this disposition of his species. Dr. Packard had Mr. Grote's type, and his opinion, with such opportunity of comparison, ought to be final. Certain it is if it be not *E. duaria*, it is *E. hypochraria* H. Sch. The description seems to be of the reddish form of the latter. But Dr. Packard's opinion will have to govern us till we have more light. What has become of Mr. Grote's type I do not know. It is not in the Central Park Collection where Mr. Grote thought it might be. *E. duaria* Guen. differs very much in appearance, the wings being rectangular and very rounded in some male specimens, and very pointed, falcate and angulated in some females.

Endropia amœnaria Guen. *E. arefactaria* G. and R. is a synonym of this species. If one take Mr. Grote's description of his species, and compare it with a specimen of *E. amœnaria* he will not doubt their identity. Dr. Packard had Mr. Grote's type, and his description and figure in his Geometrid Moths are from this type specimen. I speak of this as Mr. Grote has in later years claimed that his species and that of Guenee were not identical, although he admits his may be a variety. In looking over Mr. Neumœgen's collection, which in 1882 Mr. Grote studied, I find several specimens with label "*Endropia arefactaria* Gr." in Mr. Grote's handwriting. It may be Mr. Grote has identified this same form in other collections as his species. But this is not *E. amœnaria* at all, but a slight variation from the type form of *E. madusaria* Wlk., not sufficiently distinct however to deserve a varietal name

Endropia helveolaria Hulst. In Mr. Neumœgen's collection I find 2 ♂♂ and 1 ♀ of this species, each with label in Mr. Grote's handwriting "*Lychnosea aulularia* Gr. Type." I cannot find the published description of either the genus or the species. The specific name, if it were published at the time of Mr. Grote's study of Mr. Neumœgen's collection (1882) would be a synonym. What the fate of the genus would be I cannot say, for the insect is likely not an *Endropia.*

Ellopia fervidaria Hübn. Dr. Packard includes under this species *E. fiscellaria* Guen., *E. flagitaria* Guen., and as well the form called by me *E. somniaria.* I have before me of what I esteem the true *E. fervidaria* 39 specimens, of *E. fiscellaria* 30, of *E. somniaria* 9. *E. flagitaria* will not stand as a distinct species, but the other three seem to me not to intergrade, and to be good species. In *E. fiscellaria* Guen., there is very great variation in the width of the cross lines. In one specimen from

Mr. Hill of Albany, N. Y., they coalesce, and in one possessed by Mr. Bruce of Brockport, N. Y. they coalesce and are broken at the middle of the wing, thus forming a loop on costa and inner edge.

Ellopia endropiaria G. and R. It is very probable that this is a synonym of *E. pultaria* Guen. The angulation of the wings which Guenee speaks of, and which leads Dr. Packard to think Guenee's species is not the same, is a matter of no specific importance. I have some specimens with angulated, and others with rounded wings. The angulation of the wings, which seems to have been given generic, often subfamily value, is among our *Ennominæ*, not even specific in value. It is quite often a sexual mark, the females always having the wings more pointed, more falcate, and more angulated than the males. Often the same sex thus differs in the various specimens.

Ellopia pellucidaria G. and R. Dr. Packard places this as a synonym of *E. seminudaria* Wlk., and had the idea they represented the differing forms of the sexes. *E. bibularia* G. and R., is without doubt a synonym of *E. seminudaria* Wlk. But with 13 specimens of *E. pellucidaria* G. and R., before me, and more of *E. seminudaria* Wlk., I am of the opinion not only that E. *pellucidaria* G. and R. is a good species, but one of the most distinct of the genus. I have moreover both males and females of both species, so Dr. Packard's idea that they represent the sexes only, is unfounded.

Metrocampa margaritata var. **perlata** Guen. While it is recognized that the American insect is not specifically distinct from the European, yet I see no reason why it should be called a synonym only. It certainly has differences which have been noted by various authors. These differences are very constant. The American insect is a good variety.

Leucula lacteolaria Hulst. This is a species of another genus new to our fauna. It makes its appearance in Arizona, not in Florida, which very curiously in the Lepidoptera has closer affinities with the tropics, than any other portion of our country.

Antepione imitata Hy. Edw. This is without doubt as Mr. Edwards suggests, a variety of *A. sulphurata* Pack. I have not seen the type, but have intergrading specimens.

Rumia baltearia Hulst. This is, in my opinion, a variety only of *R. ochrearia* Pack. Its appearance is however very different, as the outer part of the median space forms a broad dark brown band.

Numeria occiduaria Walk. This species is generally if not universally known in collections as *N. pulveraria* Linn., and the most of Lepidopterists have judged them to be identical. In the imago state they can hardly be thought otherwise. But there seems to be a very marked difference in the larvæ. Dr. Packard gives a description of the larvæ of

both the European and American species, but does not seem to notice how different they are. That the larvæ are entirely unlike each other is confirmed to me by Mr. Bruce of Brockport, N. Y., who has raised many specimens of the European species in England, and of ours here. I think as long as the matter stands this way, it is only fair to regard the American as a good species.

Nematocampa limbaria Haw. This is the insect afterwards named *N. filimentaria* by Guenee. But the insect was undoubtedly the one described by Haworth. As such it is figured in Wood's Index Entomologicus, as it was regarded as a European as well as an American species. Both Guenee and Packard seemed to have a suspicion that Haworth's name was the correct one for the insect. Mr. Grote's *N. expunctaria* is a variety of this species. I have never met with the type form, but I have seen examples of *N. limbaria* corresponding in both the front and hind wings, but never in the same specimen.

Eurymene serinaria H. Sch. Dr. Packard thought this to be the same as *E. rosaria* Grt. He does not seem to have known *E. floscularia* Grt. Herrich-Schæffer's figure, though undescribed, is very excellent, and is not *E. rosaria* but *E. floscularia*. *E. rosaria* seems to me to be a good species, though it differs from *E. floscularia* only in a general softening of the colors, a very unreliable basis for specific distinction. But with the few specimens of each I have, the two do not seem to intergrade.

Hyperetis amicaria H. Sch. This name, as has been remarked by Mr. Grote, antedates the name *H. nyssaria* of Guenee. The latter as being the name of the form dark reddish brown on the outer third is a good variety.

The determinations given in the foregoing notes are without personal knowledge of the types of either Guenee or Walker. Dr. Packard, as well as Mr. Grote, have examined and commented upon those types, and in the majority of cases identified them.

Mr. A. G. Butler has also published some notes upon the British Museum types. Very few of the species in the *Ennominæ* of Guenee and Walker remain to be identified. A hasty count gives 6 to Guenee, 9 to Walker. But these will not disturb the synonomy much, if these authors keep up their average of synonyms. Upon another hasty count of identified species I find Guenee named 36, and Walker 44. Of those of Guenee 26 are synonyms, 10 are good. Of Walker's 38 are synonyms, 6 are good. It is however only fair to say that some which are not good species are good varieties. But with the few species undetermined, there stands very little possibility of much disturbance of the synonomy.

FOOD-PLANTS OF LEPIDOPTERA.

(No. 3. Eacles Imperialis, *Dru.*)

By Wm. Beutenmüller.

Tiliaceæ.

Tilia Americana, L. (Basswood.)
" Europæa. (European Linden.)
" alba, Michx. (White Linden.)

Anacardiaceæ.

Rhus glabra, L. (Smooth Sumac.)

Sapindaceæ.

Esculus hippocastania, L. (Com. Horse-chestnut.)
Acer saccharinum, Wang. (Sugar Maple.)
" dasycarpum, Chr. (White or Silver Maple.)
" rubrum, L. (Red or Swamp Maple.)
" pseudoplatanus, L.
Negundo aceroides, Moench. (Box Elder.)
Kölreuteria paniculata, Laxm. (The panicle-flowered Kolreuteria.)

Leguminosæ.

Gleditchia triacanthos, L. (Honey Locust.)

Rosaceæ.

Prunus Virginiana, L. (Choke Cherry.)
" serotina, Ehr. (Wild Black Cherry.)

Hamamelaceæ.

Liquidambar styraciflua, L. (Sweet Gum.)

Lauraceæ.

Sassafras officinale, Nees. (Sassafras.)
Lindera Benzoin, Meisn. (Spice-bush.)

Urticaceæ.

Ulmus fulva, Michx. (Slippery or Red Elm.)
" Americana, L. (American or White Elm.
" alata, Michx. (Whahoo or Winged Elm.)
" campestris, L. (English Field Elm.)
" suberosa, Moench. (Cork-barked Elm.)

Platanaceæ.

Platanus occidentalis, L. (American Plane or Sycamore.)
" orientalis, L. (Oriental Plane.)

Cupuliferæ.

Quercus alba, L. (White Oak.)
" macrocarpa, Michx. (Bur Oak)
" coccinea, Wang. (Scarlet Oak.)
" rubra, L. (Red Oak).
" palustris, Du Roi. (Swamp or Pin Oak.)
" Cerris vulgaris. (Turkey Oak.)
Castania vesca, L. (Chestnut.)
" pumila, Michx. (Chinquapin.)
Fagus ferruginea, Ait. (Amer. Beech.)
" sylvatica, L. (Wood or Common Beech.)
Ostrya Virginica, Willd. (Hop Hornbeam or Leverwood.)
Carpinus Americana, Michx. (Hornbeam Blue or Water Beech.)

Betulaceæ.

Betula alba, L. (White Birch.)
" var. populifolia, Spach.
Alnus incana, Willd. (Speckled or Hoary Alder.)
" serrulata, Ait. (Smooth Alder.)

Coniferæ.

Pinus strobus, L. (White Pine.)
" excelsa, Wallich. (Bhotan Pine.)
Abies excelsa, Dec. (Norway Spruce Fir.)
" " var. pendula.
Larix Americana, Michx. (American or Black Larch.)
Cupressus thyoides, L. (White Cedar.)
Taxodium distichum, Rich. (Amer. Bald Cypress.)
Juniper communis, L. (Common Juniper.)
" Virginiana, L. (Red Cedar.)

Remarks on North American Scolytids.

By E. A. Schwarz, Washington, D. C.

(Concluded from p. 42.)

Chramesus Chapuisii.

The two males I have seen are at once distinguished from those of *icoriæ* by the fringe of rather long, sparse and stiff bristles on the antennal scape. In the many males of *icoriæ* which I examined the fringe is entirely wanting.

Rhopalopleurus pumilus.

This is mentioned in Mr. Henshaw's Check List; but I do not know upon whose authority it is claimed as a North American insect. At any rate it must enter the genus *Chramesus* with which *Rhopalopleurus* is synonymous.

Cnesinus strigicollis.

The two sexes may be distinguished as follows:

Male: Front shining, flattened between the eyes, anteriorly transversely depressed, the depression clothed with short grayish hair and with a flattened tubercle on each side; antennal scape elongate, curved, sutures of club fringed with long and conspicuous hairs.

Female: Front subopaque, sharply margined between the eyes, anterior impression deeper, clothed with very dense reddish-brown hair and without tubercles, antennal scape shorter, not curved, hairs of club shorter and very fine.

Bothrosternus.

This genus was introduced into our fauna in the second edition of the Classification by Drs. Leconte and Horn but the only North American species has not yet been described. Only a few specimens are known in collections, and as the majority of them happen to be before me, the description of an isolated species may be excused.

B. Hubbardi n. sp. Oblong-ovate, reddish brown, shining, nearly glabrous above, antennæ and legs reddish. Vertex finely punctulate, front smooth, longitudinally excavated, the excavation with a deeper median line and anteriorly with a tubercle on each side; beak extremely short, smooth, and with a median tubercle. An acute ridge runs each side above the insertion of the antennæ to the middle of the eyes and is continued along the inner margin of the eyes by a series of stiff yellowish bristles which increase in length posteriorly. Thorax convex, a little wider than long, sides nearly straight from base to middle, thence very much rounded, hind angles rectangular, anterior angles very obtuse, surface densely strigoso-punctate, without smooth median line but with the punctures on the disk and middle of base not oblong and sparser, side margin indicated from base to beyond middle, flanks densely rugosely punctate. Scutellum hardly depressed. Elytra twice longer and at base distinctly wider than the thorax, punctate-striate, interstices flat, rather sparsely rugosely punctate, on the disk wider than the striæ, narrowing on the declivity and each being furnished on the posterior half of the elytra with a row of semi-recumbent, short, yellowish bristles. Underside with sparse, short pubescence, front coxæ still more

widely separated than in *Chesinus*, ante-coxal ridges acute, metasternum rather coarsely punctate, abdominal segments convex, moderately strongly punctate. Anterior legs very little stouter than the posterior ones; front tibiæ with an acute tooth at apical third and with the outer apical angle prolonged into a broad process which is longer than the first tarsal joint and which terminates in two acute, recurved teeth. Length 2.5 mm.

Described from six specimens in which I fail to observe any sexual characters. Three specimens were collected by Mr. H. G. Hubbard, to whom the species is dedicated, at St. Lucie in Southern Florida on April 26th. From his diary I infer that they were beaten from Hickory trees. The three other specimens are from the collection of Mr. Henry Ulke and are also from Florida.

Four South American species of Bothrosternus have been described which are known to me only from the descriptions. *B. Hubbardi* seems to come nearest to *truncatus* Eichh., but differs in the form and sculpture of the thorax. In our own fauna the species cannot well be confounded with any other Scolytid.

Hylesinus fraxini.

This is said (Eichh., Europ. Borkenk., p. 136), to occur in California; but I have never seen North American specimens answering the description of this European species.

Hylesinus trifolii Mueller,

is omitted from Henshaw's List and ought to be inserted after *opaculus*. (see Dr. Riley in Report of the Commissioner of Agricult., 1878, p. 248), According to Chapuis's and Eichhoff's mode of classification *trifolii* belongs to the second division of *Hylastes* in which the third tarsal joint is bilobed and the elytra separately rounded at base. This division is identical with Leconte's genus *Hylurgops* of his group *Hylastes*, which is distinguished by him from the typical *Hylurgi* by the relative length of the abdominal segments and the not-depressed scutellum. Both characters hold true so far as the genus *Hylastes* is concerned but are of little practical value for distinguishing the genus *Hylurgops*. Still, I think that *trifolii* ought to be placed in the genus *Hylesinus* on account of the structure of the antennal club. In this genus the first joint of the club is but little larger than the following, and always pubescent; whereas in *Hylastes* and *Hylurgops* it is nearly as large as the rest of the club always glabrous. This is the only species in our fauna of the tribe *Hylurgini* which is known to infest an horbaccous plant.

Phlœosinus punctatus.

The sexual characters will help to distinguish this from the other North American species:

Male: Front excavated, excavation smooth at middle and anteriorly with a small tubercle. Tubercles on the elytral declivity more prominent.

Female: Front not excavated, but with a narrow median carina not reaching the vertex. Tubercles on the elytral declivity smaller.

These sexual characters are nearly the same as in the European *P. thujæ.*

Phlœosinus serratus.

Can this be the male of *dentatus*? The specific differences given by Dr. Leconte are about the same as those between the two sexes of the European *Ph. Aubei.* Both forms, that with alternately elevated elytral interstices (*serratus*) and that with equal interstices (*dentatus*) have the same food plant (Juniper), were beaten by Mr. Ulke and myself from the same trees, and have the same geographical distribution. Still, absolute proof of their identity is wanting, but the question can be easily settled by anyone who has the opportunity of finding colonies of the beetle still in their larval galleries. Both forms are widely distributed, occurring from Maine to Florida and from Dakota to Texas and Arizona, and I can see no reason why *Ph. Haagi* Eichh., (Berl. Ent. Zeit. 1868) should not be synonymous with *dentatus*, and *Ph. graniger* Chap. (Syn. d. Scol., p. 247) with *serratus*.

Dendroctonus.

I have lately examined, in company with Mr. Ulke, a large series of specimens in our collections, and we found that our species could be sharply separated and all difficulties in their determination removed if *D. rufipennis, punctatus* and *simplex* were considered to form a single species, variable in size and sculpture of head and thorax. The variation in size between these three forms is not greater than that exhibited in *D. terebrans* and the same sculptural differences may also be observed in the latter species. However, nothing definite can be said before the life-history of the different forms has been studied.

Crypturgus atomus

seems to be identical with the European *C. pusillus* Gyllh. (see Eichhoff, Europ. Borkenk., p. 166).

Hylurgops pinifex

is synonymous with the European *Hylastes glabratus* Zett.

We regret to record the death of Mr. Fredk. W. Klages of Pittsbugh, Pa., who died of pneumonia on the 27th day of March 1886 in the 27th year of his age. Mr. Klages was an enhusiastic collector, and though a mechanic, with little time to spare, yet gathered a considerable collection. He collected in Kentucky, Florida and Jamaica as well as in the vicinity of Pittsburgh.

Entomology can ill afford to lose a young man so enthusiastic as Mr. Klages in his chosen study.

On the variation and constancy of the elytral markings in Chrysomela, Doryphora and allied genera.

By C. H. T. Townsend.

I have seen some discussion lately concerning the elytral variations of *Chrysomela scalaris* Lec., aroused by Mr. Angell's interesting notes on the species in a previous number of this journal. I had not intended writing anything on this subject until next season, after having had an opportunity to examine as large a number of specimens as possible during the summer, but perhaps a few general remarks at the present time on this and one or two allied genera will not be out of place.

Some interesting notes on a sudden abundance of *scalaris* have lately been contributed by Dr. Hagen (Can. Entom., vol. XVI, p. 120 and 225—6), and some other important observations by Mr. Caulfield (Can. Entom., vol. XVI, p. 226—7 and XVII, p. 230). I have never known this species to be abundant in this locality; nearly every season I have taken a few specimens, but no more. I shall find out, whether the species is variable or constant here next season, but allow me to give it as my opinion that if it does not appear in large numbers it will be *variable*. Mr. Angell, as above referred to, says of *scalaris*: "Hundreds collected at Cambridge last summer show scarcely any variation, while specimens from New Jersey, Cape Cod and principally Canada are decidedly inconstant and variable." This bears out my observations precisely. At Cambridge the species had increased in large numbers and was very constant, while the specimens from other parts of the country, where they had not increased to any extent but were only normally abundant, were very inconstant and variable. This is the point which I wish to bring out. When the species is over-plentiful it seems to be constant, but normally presents many variations. Mr. Caulfield's observations seem to bear me out likewise; from his notes it appears that *scalaris* is abundant at times in the neighborhood of Montreal, and very constant. Packard states (Bull. U.S. Ent. Com., No. 7, p. 126—7) that in the Summer of 1881 it was very abundant at Brunswick, Maine, on the linden. From specimens taken in July and August he has drawn up descriptions, from which it will readily be seen that the form was extremely constant, and very near the *scalaris* type.

A more familiar case to many of us is *Doryphora 10-lineata* Say, which has become a pest from its abundance, and seems to hold its own as the years roll on. As is well known it shows no variation, but is very constant; it certainly does not vary here (this strip of the country is included in its original line of most direct spread), and no variations have been noticed to my knowledge in any part of the territory overrun since it began to increase. Specimens taken by me in Lawrence, Kansas, in

1874 (twelve years ago), show no differences when compared with recent specimens from this locality, except perhaps that the species has grown slightly more robust. Yet it undoubtedly varied in its normal state in the West, before it began to increase and take to the potato. The interesting particulars of its yearly eastward spread since 1859 are given by Packard in his Report on the Rocky Mountain locust and other injurious insects of the West (Rep. of Geol. & Geog. Survey for 1875, p. 722–6). Say gives its original habitat as the Upper Missouri, and mentions a white variety with two of the lines united, supposed to be *juncta* Germ., which he took on the Arkansas. This latter form, which differs from *10-lineata* in the larva state as well as in the imago and is now considered a distinct species, is found in the more southern States and according to Packard originally represented the latter on the eastern slope of the Rocky Mountain Plateau. It is one of the old-time variations of *10-lineata*. Glover has mentioned and figured a form (U.S. Agr. Rep. for 1869, p. 123) which he says "is an apparent cross between the two (*10-lineata* and *juncta*), or a variety once found in the South, in which the heavy, thick black line of the *juncta* has a very fine yellowish line running partly through it longitudinally".

I have a specimen from Missouri (near St. Louis, taken June 29th, 1884), which has a well marked *purplish* line running partly through the heavy black one longitudinally, and with the elytra purplish next the suture and around the edges; otherwise as in *juncta*, of which these last two are variations. Another form, *defecta* Stäl, is recognized as a variety of *10-lineata*, but is a more modern variation than *juncta*. These three forms are represented in Mexico, Costa Rica and parts of western South America by *11-lineata* Stäl, from which *10-lineata* probably originated, and subsequently gave origin to *juncta* and *defecta*. This interesting representative of the ancestral form of the "Colorado potato-beetle" has recently been recorded within our territorial limits.

Eight specimens of *clivicollis* Kirby taken here at different times show a series of four finely marked forms: five of the normal form; one in which the normal posterior marking of each elytron, formed by two linear markings meeting at an acute angle forward, is represented by a three-sided blotch; and two very striking variations, in one of which the two anterior markings of each elytron are united in one broad black band across both elytra, while in the other the same broad band is present but with the posterior three-sided blotch also. These are two very interesting variations, especially as this is quite constant compared with many others.

As another example in another genus of the family, I would mention *Lina* (formerly *Plagiodera*) *scripta* Fab. This species, which I have taken

in abundance in Louisiana, was at that time very constant, every specimen (of forty-three collected) being marked exactly the same, the normal form being represented (see Psyche, vol. IV, p. 222). But Prof. Riley has described and figured many variations of it from the West, which were doubtless taken when the species was in its normal state of abundance. Eight specimens of *lapponica* Linn. taken here (where I have never known it to be abundant) show a series of five well marked variations.

The cause of the constancy of a form when it becomes very numerous in individuals is at first somewhat hard to see. We would naturally suppose that under such circumstances it would be very inconstant, as sexual selection would seem to have played no part, but all the individuals would naturally have had to pair to produce such abundance. But here is just where we overlook the part which sexual selection has played —and it certainly is the cause to which this constancy is to be attributed. The form of a species which first begins to multiply rapidly and thus gets ahead of its kindred forms (it is likely to be the typical form, as that is the most numerous in individuals), is the one that will win. And it will be constant because sexual selection preserves the *standard* of beauty in a race which standard is determined by the majority. Now the large majority in a species that has begun to increase is the typical form, and from this we see that if a species happens to multiply unduly (we know not from what cause) and thus gets a start, it will perpetuate its type and remain constant, while its kindred variations will be pushed to the wall in the struggle for existence. Some influence seems to guard the propagation of a form while it is in a state of abundance, so that only the form itself is produced and no variations occur. The image of the favored form, so predominant and numerous, seems to be deeply fixed in the being of the parent-beetle to produce this form. But as long as the species is in its accustomed state, variations are very frequently produced; and moreover they find room for themselves and increase. At all events these are the facts; I have given the explanation as I see it.

In conclusion, if *C. scalaris* Lec. is shown, as it no doubt will be, to graduate by variations into the form of *philadelphica* Linn., it will have to be considered a variety of the latter; though other forms, as nearly related as these two, but not having connecting variations, must necessarily be regarded as distinct species. In other words *scalaris* is not a perfected species yet, but will be in time. How long a time may be told by entomologists some centuries hence, when its connecting variations have passed away or developed into new species.

Synopses of Cerambycidae.

By Chas. W. Leng, B.S.

(Continued from p. 32.)

CALLICHROMINI and TRACHYDERINI.

These two tribes are for convenience considered together. They include all the Longicorns with a triangular scutellum, more or less acute, and varying considerably in size. The species belong almost entirely to the warmer parts of the country. The arrangement of genera is as follows:

Front coxal cavities closed behind..... **Callichroma.**
Front coxal cavities open;
  Mandibles acute or simple at tip:
    Pronotum broadly lobed at base; poriferous system of antennæ very distinct;
      Metasternal pores absent, side pieces very wide..... **Megaderus.**
      Metasternal pores distinct..... 2
    Pronotum not lobed, sometimes subsinuate at base, poriferous system often obsolete, and palpi in some genera scarcely impressed..... 3
  Mandibles emarginate at tip..... 4
2 Prothorax strongly armed on sides..... **Dendrobias.**
  Prothorax uniformly convex..... **Lissonotus.**
3 Front large, square, perpendicular, abruptly separated from the ante-ocular space;
  Prosternum vertical behind..... **Stenaspis.**
  Prosternum arcuate at tip.
    Elytra distinctly margined at the sides..... **Crioprosopus.**
    Elytra not or obtusely margined;
      Prothorax armed with a lateral spine; mesosternum not protuberant;
        Body pubescent..... **Tragidion.**
        Body glabrous, ♂ elytra costate..... **Purpuricenus.**
        Body glabrous, ♂ without antennal tubercles..... **Metaleptus.**
      Prothorax rounded, convex..... **Æthecerus.**
Front moderate, short, declivous, not abruptly defined each side;
  Two ivory vittæ on each elytron; prothorax margined at apex;
    Mesosternum declivous..... **Mannophorus.**
  One ivory vitta on each elytron; prothorax not margined at apex.
    Mesosternum protuberant..... **Entomosterna.**
  Elytra without ivory vittæ, mesosternum declivous;
    Body pubescent; prothorax not margined at apex..... **Amannus.**
    Body pilose; prothorax margined at apex..... **Batyle.**
4 Elytra without ivory vittæ;
  Prothorax with an acute lateral spine;
    Eyes not divided; pubescence fine..... **Oxoplus.**
    Eyes divided; pubescence coarse..... **Schizax.**
  Prothorax rounded on sides, with dorsal callosities..... **Tylosis.**
  Prothorax rounded on sides, or feebly spinose, without dorsal callosities, pubescence long and partly erect..... **Crossidius.**
  Prothorax narrowed in front, mesosternum convex..... **Sphænothecus.**
Each elytron with two ivory vittæ, prothorax narrowed in front;

Mesosternum declivous, body robust..... .**Perarthrus.**
Mesosternum protuberant, body slender.....**Ischnocnemis.**

The structural characters are so described by above schedule that they will not be rehearsed in the specific descriptions. The student is referred to the "Classification" for further characters.

CALLICHROMA Lat.

The prothorax is very rugose and armed with a strong lateral spine and the scutellum is moderate in size.

SYNOPSIS OF CALLICHROMA.

Thighs orange;
Elytra and parts beneath except abdomen and legs metallic green, tinged with a coppery hue.....**splendidum.**
Metallic green only .....**plicatum.**
Front and middle thighs black, elytra blue..... .....**cobaltinum.**
Thighs black, elytra velvety black..... . **melancholicum.**

C. splendidum Lec. J.A.P., ser. 2, II, 1850, p. 37; Dej. Cat., 3d ed. p. 349; *elegans* Hald. Trans. Am. Phil., X, 1847, p. 31.

Length 1.25 to 1.50 in. = 28 to 40 mm. Hab. Southern States. (Pl. , fig. 4.)

The coppery hue which is always distinct on the thorax, sometimes is spread entirely over the elytra and this form is traditionally known as *virescens*.

C. plicatum Lec. Proc. Ac. Phil., VI, 1853, p. 233. Length 1 to 1.5 in. = 25 to 40 mm. Hab. Texas.

C. cobaltinum Lec. S.M.C., No. 264, 1873, p. 195. Length 1 to 1.5 in. = 25 to 36 mm. Hab. Lower California.

The transverse rugæ of the prothorax are not so coarse as in the two preceding species and the anterior transverse constriction is more regular and stronger.

C. melancholicum Bates. Trans. Ent. Soc., London, 1872, p. 186; Chev. Mss. Length 1.25 inch. = 30 mm. Hab. Mexican Boundary.

All velvety black, except the legs and antennæ, which are shining.

MEGADERUS Serv.

M. bifasciatus Dup. Mag. Zool. 1836, Cl. IX, p. 5, t. 141, f. 2; Lec. J.A.P., ser. 2, II, 1852, p. 176; Dej. Cat., 3d ed., p. 344; *corallifer* Newn., Mag. Nat. Hist. ser. 2, IV, p. 195; Hald. Stansb. Expl. App. t. 9, f. 15. Length 1 in. = 25 mm. Hab. Texas, Ariz.

Black, tibiæ and elytra partly rufous, but very variable in the arrangement of the color. The thorax is very roughly punctured and the scutellum large and acutely triangular. (Pl. , fig. 5.)

DENDROBIAS Serv.

D. mandibularis Serv. Ann. Ent. Soc. Fr., 1834, ser. 1, III, p. 42; Dup. Mag. Zool. 1836, IX, p. 23, pl. 151, f. 1, ♂; *4-maculatus* Klug, Dej. Cat., 3d ed. p. 345; Dup. l.c., p. 22, pl. 151, f. 2; *basalis* Dup. l.c., 1840, XIII, p. 6, pl. 33; *testaceus* Dup, l.c., IX, p. 24, pl. 152, f. 1; Lac. Gen. Col., 1869, IX, p. 201, note 1; *sartorius* Höppner, Dej. Cat., 3d ed., p. 345. Length .80 to 1.20 in. = 20 to 30 mm. Hab. Cal., Tex., Ariz., New Mex. and Mex.

For the above synonymy I am indebted to Mr. Samuel Henshaw. Piceous, variously variegated with dark yellow. Elytra black with four large yellow spots. The thorax is rugose and armed with a sharp lateral spine and and the scutellum nearly as large as in *Megaderus* (Pl. , fig. 6.)

LISSONOTUS Dalm.

L. multifasciatus Dup. Mag. Zool. 1836, Cl. IX, p. 10, t. 143, f. 3. Length .75 in. = 17 mm. Hab. Arizona, Cal.

Black, elytra variously banded with yellow. Thorax is smooth and scutellum again large. (Pl. , fig. 7.)

STENASPIS Serv.

Contains two species easily separated by their color. The thorax is obsoletely rugose with tubercles at sides and finely punctured and the scutellum moderate in size but acutely triangular.

S. verticalis Serv. Ann. Fr., 1854, p. 52; Dup. l. c., p. 57, t. 216, f. 1; *Dejeani* Hœppner, Dej. Cat., 3d ed., p. 346; *superba* Newn. Ent. Mag. V, p. 493. Length 1.25 in. = 30 mm. Hab. Texas, Ariz.

The thorax and beneath yellowish rufous except abdomen, knees, tarsi, and three spots on prothorax black; antennæ yellow and black; elytra purplish blue, shining. (Pl. , fig. 8.)

S. solitaria Say. J.A.P., III, 1823, p. 410; Lec. J.A.P., ser. 2, II, 1850, p. 9; Proc. Ac. Phil., VI, p. 441; Col. Kans. p. 30, t. 2, f. 14 ♀; *unicolor* l.c. Suppl. p. 11, t. 38. Length 1.5 in. = 40 mm. Hab. Texas, Ark., Kan., Col., N. Mex. and Arizona.

Uniform bluish black, slightly shining.

CRIOPROSOPUS Serv.

Contains three species with coarsely punctured thorax and moderate but acutely triangular scutellum.

SYNOPSIS OF CRIOPROSOPUS.

Prothorax black.....**splendens.**
Prothorax orange, spotted with black.....**magnificus.**
Prothorax black, sides with orange border.....**lateralis.**

C. splendens Lec. Proc. Ac. Nat. Sci. Phil., VI, p. 441; Arcan. Nat. 1859, p. 127, t. 12, f. 9; *rimosus* Buq ‡ Rev. Zool., 1840, p. 142; Mag. Zool., 1841, t. 66. Length 1.37 in. = 35 mm. Hab. Texas.

The elytra are remarkable for the very deep and angular confluent rugosities and the beautiful shining green color. The legs are more or less yellow and otherwise the insect is black. (Pl. , fig. 9.)

C. magnificus Lec. Trans. Am. Ent. Soc. V, 1875, p. 173. Length 1.5 in. = 38 mm. Hab. Arizona.

Bright orange, mouth, antennæ, knees, tibiæ and tarsi black, head, prothorax and abdomen spotted with black and elytra black with two broad orange bands connected by narrow marginal line of same color.

C. lateralis Lec. Trans. Am. Ent. Soc. XII, 1884, p. 23. Length .44 in. = 11 mm. Hab. Texas.

Black, clothed above and beneath with fine, erect, ashy pubescence. Beneath finely, above deeply and coarsely punctured. Sides of prothorax with broad orange border. Elytra with narrow side margin and broad transverse fascia orange. This is the smallest Trachyderide known.

(To be continued.)

Explanation of Plates II and III.

The figuring is consecutive, and the numbers are scattered over both plates. Figs. 24 to 26 represent forms not obtainable when the genus was treated of. Starred figures we owe to Dr. Horn.

1 Elytroleptus floridanus.
2 Holopleura marginata.
3 Rosalia funebris.
4 Callichroma splendidum.
5 Megaderus bifasciatus.
6 Dendrobias mandibularis.
7 Lissonotus multifasciatus.
8 Stenaspis solitaria.
9 Crioprosopus splendens.
10 Tragidion coquus.
11 Purpuricenus humeralis.
12* Metaleptus Batesi.
13 Æthecerus Wilsoni.
14 Mannophorus lætus.
15 Batyle ignicollis.
16* Oxoplus corallinus.
17* Schizax senex.
18 Tylosis maculata.
19 Crossidius discoideus.
20 " intermedius.
21 Sphænothecus suturalis.
22 Ischnocnemis bivittatus.
23 Entomosterna cyanicollis.
24* Nothorhina aspera.
25* Hypexilis pallidus.
26 Hammaticherus castaneus. (after the Biol. Cent. Am.)
27 Callimus ruficollis.
28 Rhopalophora longipes.

Notes and News.

Flight of Water Beetles.

A few days since while passing a small pond, I stopped to notice the swarms of *Gyrinus* on the surface and shortly after was struck by the appearance of certain small black insects flying in the air. A few moments of close observation proved my suspicion, that the flying insects were *Gyrinus*, to be correct, and I was able by careful watching for a little while to observe the process entire. The insects after swimming about on the surface for a time, or sometimes almost immediately after coming to surface, would proceed to crawl up on the stones at the bank or upon partially submerged sticks, grass etc. After climbing up a few inches from the surface of the water, (I saw some as high as ten or twelve inches) they would remain quiet for a while, apparently waiting to become perfectly dry, then suddenly extend the wings and fly, taking to flight so quickly that I was unable to catch sight of the wings till they were in the air. Frequently they would fail to get well into the air, perhaps caught by a sudden gust, and capsize upon the surface, in which

cases they folded their wings as quickly as possible and dove out of sight; whether any of these capsized ones made a second effort I could not determine. When they made a good flight they rose rapidly to a height of forty or fifty feet, then flew away with the wind and would be very quickly lost to sight. The species is one rather common in this locality, *Gyrinus analis*.

I also saw several individuals of *Hydrophilus glaber* on stones and sticks several inches above the surface of the water but did not see any of them take to flight.

It was a warm spring day, and about half past four when I first noticed the beetles. I watched them till nearly sundown, but they were not nearly so plenty the latter part of the time, partly perhaps on account of the change in temperature, possibly partly on account of my taking advantage of their terrestrial habit to secure a number of specimens.

AMES, IOWA. HERBERT OSBORN.

* * *

We have received a circular referring to a Summer Course in Entomology and General Invertebrate Zoology at the Cornell University, Ithaca, N.Y. Prof. J. H. Comstock is in charge of this Department, and the course will comprise lectures, laboratory practice and field work. It will begin Monday, June 21st, and continue 10 weeks. The fee to others than college graduates or undergraduates taking regular courses at the University, will be $25. This is an excellent way of spending a summer vacation—it enables an Entomologist to follow his hobby, and at the same time initiates him into methods of study that will prove advantageous to him in the further pursuit of his favorite science.

Book Notices.

Dinapate Wrightii and its larva. By George H. Horn, M.D. Trans. Am. Ent. Soc. XIII, pp. 1—4 and Pl. I.

That a Bostrychid, nearly two inches in length, should remain so long undiscovered is passing strange; but this is what Dr. Horn presents to us in the above paper. It is from the Mojave desert, Calif., which if the rest of its fauna is as peculiar as this species must be an Entomological paradise.

Society News.

Brooklyn Entomological Society. May 4th, 1886. — Twenty members present, the President in the chair. Dr. S. W. Williston of New Haven, Conn., was elected a member of the Society. Mr. Leng was appointed a committee to arrange for the annual excursion of the Society on May 31st.

Mr. Smith read a paper on "Ants' nests and their inhabitants", giving a popular account of myrmecophilous insects and their habits. Dr. Williston supplemented the acount with further notes on the Diptera found in ants nests either in the larval or mature stage, and remarked on some curious resemblances of certain Diptera to ants.

Mr. Weeks read a brief paper on some parasitic Hymenoptera and Diptera, merely mentioning the facts of their occurrence. Dr. Williston added a few remarks on the life habits of some *Tachinids*.

ENTOMOLOGICA AMERICANA

VOL. II. BROOKLYN, JULY, 1886. NO. 4.

Record of some Contributions to the Literature of North American Beetles, published in 1885.

By Samuel Henshaw,

In Part II the first number refers to the author-list in Part I.

A few articles either accidentally omitted from or received too late for insertion in the previous Record (Ent. Amer. v. I, p. 41.) are included now. A few papers of general interest although not especially relating to American beetles are also included.

In the papers recorded sixteen (16) new genera and two-hundred and fifty (250) new species are described by nine (9) authors.

PART I.

Angell, G. W. J.

1 Notes on Chrysomela scalaris Lec.
Ent. Amer. 1885, v. I, p. 126-128, figures.

Bell, J. T.

2 List of Staphylinidae taken at Belleville, Ont.
Ca. Ent. 1885, v. 17, p. 49-59.
Sixty-six named species.

3 (Xylorycetes satyrus in Ontario.
Ca. Ent. 1885, v. 17, p. 58.

Belon, Marie-Joseph.

4 Note sur quelques espéces du genre Cartodere Thoms.
C. R. Soc. Ent. Belg. 1884, v. 28, p. cxci-cxciii.
Describes C. intermedia n. sp., synoptic table of related species; doubts the occurence in N. America of Lathridius filiformis Gyll.

Berge, A.

5 Énumération des Cétonides décrits depuis la publication du catalogue de MM. Gemminger et de Harold.
Ann. Ent. Soc. Belg. 1884, v. 28, p. 113–163.

Bergroth, E.

6 Vega-Coleoptera und Hemiptera.
Ent. Nachrichten 1885, v. 11, p. 268–270.
List with localities of the species mentioned and described by Sahlberg in his reports upon the Vega collections.

Bisshopp, E. F.

7 The Death-watch, (Xestobium tessellatum.)
Ent. 1884, v. 17, p. 237-238.

Blanchard, F.

8 On the species of Canthon and Phanaeus of the United States with notes on other genera.
Trans. Am. Ent. Soc. 1885, v. 12, p. 163-172.

9 Cryptobium flavicorne Lec.
Ca. Ent. 1885, v. 17, p. 180.
Distinct from C. pallipes.

Bonhoure, Alph.

10 Note sur le Platypsylla castoris Ritsema et sa capture en France.
Ann. Soc. Ent. France, 1884, ser. 6. v. 4, p. 147–154, plate 6.

Branden, C. Van den

11 Catalogue des Coléoptéres Carnassiers aquatiques (Haliplidae, Amphizoidae, Pelobiidae et Dytiscidae.)
Ann. Soc. Ent. Belg. 1885, v. 29, p. 1-118.

Bruner, Lawrence

12 Notes from Nebraska.
Rept. Com. Agric. for 1884-85, p. 398-403.
Brief notes on Plagiodera scripta and Doryphora 10-lineata.

Casey, T. L.

13 New genera and species of Californian Coleoptera.
Bull. Cal. Acad. Sciences, 1885. v. 1. p. 283-336. 1 plate.

Caulfield, F. B.

14 Trapping Coleoptera.
Ca. Ent. 1885, v. 17, p. 229-230.
Principally Silphidae.

15 Notes on Chrysomela scalaris Lec.
Ca. Ent. 1885, v. 17, p. 230.

Clarkson, F.

16 The dung pellet-makers.
Rept. Ent. Soc. Ont. for 1884-85, p. 40.
Reprint from Ca. Ent. 1884, *v.* 16. *p.* 18–19; *see Ent. Amer. v.* 1, *p.* 42, *No.* 14.

17 The elm leaf beetle (Galeruca xanthomelaena Schrank.)
Rept. Ent. Soc. Ont. for 1884-85, p. 40-41.
Reprint from Ca. Ent. 1884, *v.* 16. *p.* 124–125; *see Ent. Amer. v.* 1, *p.* 42, *No.* 16.

18 Seaside captures (about New York.)
Ca. Ent. 1885, v. 17, p. 106-108.

19 Elaphidion villosum Fabr.
Can. Ent. 1885, v. 17, p. 188–190.

Claypole, E. W.

20 Entomology by the electric lamp.
Ca. Ent. 1888, v. 17, p. 117–119.
Record of insects attracted to the electric lamps.

Dimmock. Anna K.

21 The insects of Betula in N. America.
Psyche 1885, v. 4. p. 239-243; 271-286.
Thirty-one species of beetles are mentioned.

Dimmock, George

22 Xyloryctes satyrus and Strategus antaeus.
Ca. Ent. 1885, v. 17, p. 39.
Distribution.

Dohrn, C. A.

23 Classification of the Coleoptera of North America.
Stett. Ent. Zeit. 1884, v. 45. p. 32-37; 113-125.
Critical view of the Classification of Leconte and Horn.

24 Revision der Amerikanischen Cucujidae Nordlich von Mexico, von Thomas L. Casey.
Stett. Ent- Zeit. 1884, v. 45, p. 401-404.
Review.

25 Neuere publicationen über nordamerikanische Käfer, von Dr. Geo. H. Horn.
Stett. Ent. Zeit. 1884, v. 45, p. 444-447.
Review and extracts from Notes on Anomala and Notoxus.

Doll, J.

26 Note on Dynastes.
Bull. Bkl. E. S. 1885, v. 7, p. 120-121.
Found near tips of branches of Mt. Ash in Col. (=Ariz.)

Donckies de Donceel, H.

27 List des Brenthides décrits postérieurement au catalogue de M. M. Gemminger and von Harold.
C. R. Soc. Ent. Belg. 1884, v. 28, p. cciii–ccx.

28 Liste des Anthribides decrits postérrieurement au catalogue de M. M. Gemminger and von Harold.
C. R. Soc. Ent. Belg. 1884, v. 28, p. ccxiv–ccxxxiii.

Donovan, C. Jr.

29 Dytiscus marginalis found in salt water.
Ent. Mo. Mag. 1885, v. 22, p. 13.

Duges, Eug.

30 Metamorphoses de la Leptinotarsa undecimlineata Stäl.
Ann. Soc. Ent. Belg. 1884, v. 28, p. 1–6, plate 1 in part.

31 Metamorphoses du Tropisternus lateralis Fabricius.
Ann. Soc. Ent. Belg. 1884, v. 28, p. 7–12. plate 1 in part.

32 Metamorphoses du Mallodon angustatum Thoms.
Ann. Soc. Ent. Belg. 1884, v. 28, p. 12–18. plate 2.

Forbes, S. A.

33 Fourteenth Report of the State Entomologist on the noxious and beneficial Insects of the State of Illinois.
Springfield, Illinois, 1885.
Short notes on Hippodamia maculata and other Coccinellids, Paria aterrima, Scelodonta nebulosus, S. pubescens, Crepidodera helexines and Saperda tridentata. Index to the first twelve Illinois Reports.

Fowler, W. W.

34 Note on Hypothenemus eruditus West.
Ent. Mo. Mag. 1885, v. 21, p. 256–257.

35 Water beetles guided to water by sight and not by other senses.
Ent. 1883, v. 16 p. 286.

36 The genus Cercyon.
Ent. 1884, v. 17, p. 54-59.
Relates to British species but several found in the United States are mentioned.

37 The "Death-watch" and its sound. (Xestobium tesselatum.)
Ent. 1884, v. 17, p. 188–190.

French, G. H.

38 Larva of Chrysomela clivicollis Kby.
Ca. Ent. 1885, v. 17, p. 19.
Description; food-plant.

Frost, J.

39 Water-beetles and light reflected by glass.
Ent. 1883, v. 15, p. 286.

Fuchs, C.

40 (Collecting in California.)
Bull. Bkl. E. S. 1885, v. 7, p. 125.

Godman, F. Ducane & Osbert Salvin.

41 Biologia Centrali-Americana.
London.
Parts 35–43 *Jan.* 1885—*Dec.*1885 *contain portions of the Staphylinidæ and Bruchidae by Sharp, Malacodermata by Gorham, Longicornica by Bates, Phytophaga by Baly and Jacoby and Tenebrionidae by Champion.*

Hagen, H. A.

42 (Distribution of Xyloryctes satyrus etc.)
Ca. Ent. 1885, v. 17, p. 58–60.

Hamilton, John

43 Hibernation of Coleoptera.
Ca. Ent. 1885, v. 17, p. 35–38.

44 Short notes on Coleoptera.
Ca. Ent. 1885, v. 17, p. 45–48.

45 Remarks on some species of Coleoptera with supplementary descriptions
Ca. Ent. 1885, v. 17, p. 103–106.

46 Entomology at Brigantine Beach, N. J. in September.
Ca. Ent. 1885, v. 17, p. 201–206.

Hanham, A. W.

47 Entomological Notes.
Rept. Ent. Soc. Ont. for 1884-85 p. 41-42.
Reprint from Ca. Ent. v. 16, p 98-99. See Ent. Amer. v. 1, p. 44. No. 55.

Harrington, W. Hague.

48 (Distribution of Xyloryctes satyrus.)
Ca. Ent. 1885, v. 17, p. 58.

49 Are Cuculio larvae lignivorous?
Ent. Amer. 1885, v. 1, p. 18-19.
Answered in the affirmative.

Henshaw, S.

50 List of the Coleoptera of America, north of Mexico.
Phil. Am. Ent. Soc. 1885, 8vo. p. 161

51 (Distribution of Xyloryctes satyrus.)
Ca. Ent. 1885, v. 17, p. 40.

52 Determinations of the 36 Coleoptera described by D. Ziegler.
Ca. Ent. 1885, v. 17. p. 131–132.

53 Record of some contributions to the literature of North American beetles published in 1883-84.
Ent. Amer. 1885, v. 1, p. 41-48; 73-77

54 Coleoptera of America.
Science 1885, v. 6, p. 454.
Number of species in recent lists.

Horn, G. H.

55 Notes on some Staphylinidae.
Bull. Bkl. E. S. 1885, v. 7, p. 121–122.
Relates to the forms of Edaphus; Trogophloeus laticollis belongs to Haploderus.

56 A note on some Hydrophilidae.
Ca. Ent. 1885, v. 17, p. 137–139.
Hydrophilus and Tropisternus distinct; separation of the species of Hydrophilus; records Tropisternus apicipalpis and Berosus Salvinii from North America.

57 Synonymical Notes.
Ent. Amer. 1885, v. 1. p. 5-9.
Newman's species.

58 A note on Scotocryptus.
Ent. Amer. 1885, v. 1, p. 51–52.

59 Synonymical Notes. No. 2.
Ent. Amer. 1885, v. 1, p. 88-90.
The species described by Beauvois

60 Synonymical Notes. No. 3.
Ent. Amer. 1885, v. 1, p. 108–113.
The species described by Casey.

61 (Notes on some Cerambycidae.)
Ent. Amer. 1885, v. 1, p. 130–133.
Notes and descriptions of the species of Romaleum, Aneflus and Eustroma contributed to Leng's Synopsis of the Cerambycidae.

62 A study of some genera of Elateridae.
Trans. Am. Ent. Soc. 1885, v. 12, p. 33–52.

63 A study of the species of Cryptobium of North America.
Trans. Am. Ent. Soc. 1885, v. 12, p. 86–106. 2 plates.

64 Studies among the Meloidae.
Trans. Am. Ent. Soc. 1885, v. 12, p. 107–116.

65 Descriptions of North American Scarabaeidae.
Trans. Am. Ent. Soc. 1885, v. 12, p. 117–128.

66 Contributions to the Coleopterology of the United States. No. 4.
Trans. Am. Ent. Soc. 1885, v. 12, p. 128–162.

67 Descriptions of some new Cerambycidae with notes.
Trans. Am. Ent. Soc. 1885, v. 12, 173–197.

68 Synopsis of the Throscidae of the United States.
Trans. Am. Ent. Soc. 1885, v. 12. p. 198–208.

69 (Note on the Classification of the Staphylinidae.
Science 1885, v. 5, No. 101, p. V, Proc.

70 (Tarsal modifications in Silphidae and Cerambycidae.)
Science 1885, v. 5, No. 114, p. V. Proc.

71 (Note on Dinapate Wrightii n. g. et. n. sp.)
Science 1885, v. 5, No. 148, p. — Proc.

Hubbard, H. G.

72 Notes on the habits of Hypotrichia spissipes Lec., with description of the females.
Psyche 1885, v. 4, p. 215–217, fig.

Kerremans, Charles

73 Énumération des Buprestides décrits posterieurement au Catalogue de MM. Gemminger and de Harold.
Ann. Soc. Ent. Belg. 1885, v. 29, p. 119–157.

Kilman, A. H.

74 The punctured clover leaf weevil (Phytonomus punctatus.)
Rept. Ent. Soc. Ont. for 1884–85, p. 32.
Reprint from Ca. Ent. v. 16, *p.* 144–145; *See Ent. Amer. v.* 1, *p.* 45, *No.* 87.

Knaus, Warren.

75 Are Curculio larvae lignivorous?
Bull. Bkl. E. S. 1885, v. 7, p. 150.
Answered in the affirmative.

76 Additions to the Catalogue of Kansas Coleoptera for 1883 and 1884.
Trans. Kans. Acad. Sci. 1885, v. 9, p. 57–61.
List of 160 *species.*

77 On some salt marsh Coleoptera.
Trans. Kans. Acad. Sci. 1885, v. 9, p. 64–65.
A few species of Cicindela and one of Rhyssemus are mentioned.

Lameere, Aug.

78 Longicornes capturés aux Etats-unis par le Dr. E. Fromont.
C. R. Soc. Ent. Belg. 1884, v. 28, p, cccxxii.
Mentions a few species.

Leconte, J. L.

79 Short studies of North American Coleoptera No. 2.
Trans. Am. Ent. Soc. 1885, v. 12, p. 1–32.

Lefevre, Ed.

80 Descriptions de quatre generes nouve aux et de plusieurs espéces nouvelles de Coleoptera de la famile des Eumolpides.
C. R. Ent. Soc. Belg. 1884, v. 29, p. cxciii–ccvi.

81 (Synonymical Notes on Eumolpides)
Ann. Ent. Soc. France 1884, ser. 6, v. 4, p. xlv–xlli; lxxv–lxxvi.

Leng, C. W.

82 Synopses of Coleoptera (Cerambycidae.)
Bull. Bkl. E. S. 1885, v. 7, p. 117–119; Ent. Amer. 1885, v. 1, p. 28–35; 130–136, plates 1–3.

83 (Water-beetles.)
Ent. Amer. 1885, v. 1, p. 39.
Observed beneath ice.

84 (Abnormal Monilema.)
Ent. Amer. 1885, v. 1, p. 136.

Lintner, J. A.

85 Second report on the injurious and other insects of the State of N. Y.
Albany 1885, pp. xiv–265.
Amphicerus bicaudatus, Lema trilineatus, Tribolium ferrugineum, Brachytarsus variegatus and Aramigus Fulleri are discussed and figured; figures and brief notes of a few others are given.

Lucas, H.

86 Note sur le Gibbium scotias.
Ann. Soc. Ent. France 1884, ser. 6, v. 4, p. lxxvii–lxxviii, Bull.

87 Sur la larve du Gibbium scotias.
Ann. Soc. Ent. France 1884, ser. 6, v. 4, p. cxxiv–cxxv. Bull.

Marsh, C. D.

88 Swarming of a dung beetle, Aphodius inquinatus.
Am. Nat. 1885, v. 19, p. 716.

Matthews, A.

89 On a new genus allied to Corylophus
Ent. Mo. Mag. 1885, v. 22, p. 160–161.

Mc Donald, G. L.

90 Peculiar mistake of Dytiscus marginalis.
Ent. 1883. v. 16, p. 263–264.
Glass mistaken for water.

Moffat, J. Alston.

91 (Capture of Chrysomela pnirsa.
Ca. Ent. 1885, v. 17, p. 40.

Olliff, A. Sidney.

92 On the Coleopterous genus Holopa-

ramecus Curtis.
Ent. 1883, v. 16 p. 1–4.
Describes H. singularis Beck.

Packard, A. S.

93 Second report on the causes of the destruction of the evergreen and other forest trees in Northern New England and New York.
Rept. Com. Agric. for 1884, 1885, p. 374–383.
Monohammus confusor, Glycobius speciosus and Saerda calcarata are mentioned.

Ricksecker, L. E.

94 (Biological Notes.)
Ent. Amer. 1885, v. 1, p. 96-98.
Habits and habitats of several species.

Riley, C. V.

95 The imported elm leaf beetle. Its habits and natural history and means of counteracting its injuries.
Bull. No. 6, U.S. Dept. Agric. Div. Ent. 1885, pp. 18, figs. and 1 plate.

96 Water beetles destroying Carp.
Bull. U. S. Fish Com. 1885, v. 5, p. 311.
Species of Dytiscus or Cybister?

97 Parasites of the larva of Lachnosterna fusca.
Psyche 1885, v. 4, p. 224.

98 Report of the Entomologist.
Rept. Com. Agric. for 1884, 1885, p. 285–418, 10 plates.
The following species are discussed viz: Epicaerus imbricatus, Phyllotreta vittata, P. Zimmermani, P. albionica, Doryphora 10-lineata, Plagiodera scripta, Mallodon melanopus, Trichobaris trinotatus, Anomala varians, Sphenophorus robustus, S. sculptilis, Euphoria Kernii, Pristoscelis ater, Calandra oryzae and Aramigus Fulleri. Remedial measures. Figures.

99 On the hitherto unknown mode of oviposition in the Carabidae (Abstract.)
Proc. A. A. A. Sci. 1885, v. 33, p. 538–539.
See Ent. Amer. v. 1, p. 47, No. 129.

Sahlberg, John.

100 Bidrag till Tschuktsch-halföns insekt fauna. Coleoptera och Hemiptera insamlade under Vega-expeditionen vid halföns norra och östra kust 1878–1879.
Vega-expedionens vetenskapliga iakttagelser 1885, Bd. 4, p. 1–42.

101 Coleoptera och Hemiptera, insamlade af Vega-expeditionens medlemar à Berings sunds amerikanska-kust uti omgifningarma af Port Clarence, vid Grantley Harbour och sjön Iman-ruk den 23-26 Juli 1879.
Vega-expeditionens vetenskapliga iakttagelser 1885, Bd. 4, p. 43–58.

102 Coleoptera och Hemiptera insamlade af Vega-expeditionens medlemar pa Bering-on den 15-18 Augusti 1879
Vega-expeditionens vetenskapliga iakttagelser 1885, Bd. 4, p. 59–71.
Mentions a few species found in the United States.

Schwarz, E. A.

103 (Note on montane beetles.)
Science 1885, v. 5, No. 120, p. V, Proc.

104 (Mandibular appendages of Epicaerus imbricatus.)
Science 1885, v. 5, No. 120, p. V. Proc.

Seher, Thaddeus.

105 (Distribution and habitat of Rhopalopus sanguinicollis.)
Ent. Amer. 1885, v. 1, p. 156.

Sharp, D.

106 Note on the genus Plagithmysus Motsch.
C. R. Soc. Ent. Belg. 1885, v. 29, p. lxxiv–lxxvi.
Not seen.

107 Note on Hydrobius fuscipes.
Ent. Mo. Mag. 1884, v. 21, p. 84-85

Smith, J. B.

108 Dynastes again.

Bull. Bkl. E. S. 1885, v. 7, p. 151.
Hell's Canon in Ariz. not Col.; distribution of D. Granti.

109 (Lycus Fernandezi found in Tex.)
Bull. Bkl. E. S. 1885, v. 7, p. 125.

110 Species, varieties and races.
Ca. Ent. 1885, v. 17, p. 3–9.
Describes the variations among several species of Cicindela.

111 Water beetles.
Ent. Amer. 1885, v. 1, p. 16.
Favorable places and seasons of the year for collecting; net.

112 An abnormal Lucanus cervus.
Ent. Amer. 1885, v. 1, p. 27.

113 Stylopidae.
Ent. Amer. 1885, v. 1, p. 38.

114 (Color of Coptocycla aurichalcea.)
Ent. Amer. 1885, v. 1, p. 78.

115 Some new species of Hispini.
Ent. Amer. 1885, v. 1, p. 94–95.

Snow, F. H.

116 Lists of Lepidoptera and Coleoptera collected in New Mexico by the Kansas University scientific expedition of 1883 and 1884.
Trans. Kans. Acad. Sci. 1885, v. 9, p. 65–69.
Mentions about 150 *species, some are not fully identified.*

Townsend, C. H. T.

117 A list of Coleoptera collected in Louisiana on or south of parallel 30°.
Ca. Ent. 1885, v. 17, p. 66–73.
About 110 *species are mentioned.*

118 On the distribution of the genera of Carabidae along a river system.
Ca. Ent. 1885, v. 17, p. 170–171.

119 Notes on Acmaeodera pulchella Hbst.
Ca. Ent. 1885, v. 17, p. 231–232.
Variation and food plants.

120 Notes on some Coleoptera taken in South Louisiana.
Psyche 1885, v. 4, p. 219–222.

Walker, J. J., and W. W. Fowler.

121 Coleoptera in salt water.
Ent. Mo. Mag. 1885, v. 22, p. 45.

Websdale, G. R.

122 The Death watch and its sound.
Ent. 1884, v. 17, p. 236–237.
Xestobium tesselatum is mentioned.

Wenzel, H. W.

123 Note on Sandalus.
Ent. Amer. 1885, v. 1, p. 107.
Habitat.

Wood, Theodore.

124 Hydradephaga in salt water.
Ent. Mo. Mag. 1885, v. 22, p. 44-45

125 Experiments with Bruchus infested Beans.
Ent. Mo. Mag. 1885, v. 22, p. 114.
Germinating qualities not affected; reproductive capabilities of adult plants injured; plants free from attacks of Aphis rumicis.

(To be continued.)

Among the tools of trade which a Coleopterist ought to carry into the woods with him, is a pipe and some vile tobacco. By puffing smoke into the crevices of bark, into cracks, crevices, cavities in trees and other places where insects hide, the inhabitants may be easily dislodged. I have seen a dozen beetles run out of the crevices on top of a stump, after I had supposed I had taken everything to be found there.

The species of *Chalcophora* as a rule feed on evergreens. Among the American species *C. campestris* Say has been taken by Mr. Schwarz and myself on sycamore, which they attack when the tree is entirely dead and dry, and this is the only species thus far known that feeds in deciduous trees. It is likely that *C. Fulleri*, which resembles *campestris* very strongly in form, will be found to have similar habits. J.B.S.

Notes and News.

GROSVENOR LIBRARY, Buffalo, N. Y., 5–21–'86.

Dear Sir: I take pleasure in informing you that at a recent meeting of Buffalo Entomologists, held for the purpose of making arrangements for the entertainment of the Entomological Club of the A.A.A.S., it was decided to tender the Club a reception on the occasion of their coming meeting here in August next; and also an excursion to some point of interest near the city.

We hope there will be a good attendance at these meetings; and shall do everything in our power to make them successful and enjoyable.

Sincerely yours,

E. P. VAN DUZEE, Secretary.

JOHN B. SMITH,

Secretary Entomological Club, A. A. A. S,

It is hoped that the attendance of Entomologists will be large, and that they will come well provided to add to the interest of the meetings. It is desirable that those who expect to attend and who will have papers to read, send in the titles, and the time they expect to occupy to Prof. J. A. Lintner, Albany, N.Y., Prof. C. V. Riley, Washington, D. C. or Mr. John B. Smith, National Museum, Washington, D. C. In the next number we shall hope to publish further particulars. as well as a programme for the first meeting. J.B.S.

Book Notices.

Dr. H. A. Hagen's Monograph of the Embidina is one of the most important memoirs that has appeared in the Canadian Entomologist for several years.

It fills somewhat over fifty pages, was commenced in the August (1885) number and concluded in the number for November.

Seventeen species are recognized, four being described as new, one of these (Oligotoma Hubbardi) taken at Enterprise, Fla., by Mr. H. G. Hubbard is the only species recorded from the United States. Species of Embidina are so rare that few American entomologists have seen them; the concluding part of Dr. Hagen's memoir however giving the family characters, notes on systematic position, habits, distribution &c., is of special value and interest to all students.

Dr. Hagen with his unrivalled knowledge and material owes science the elaboration of the American species of Neuroptera and we hope this paper may be taken as an assurance that the work will not be left to less skilled hands.

On the American species of the genus Utetheisa, *Huebner*.

By H. B. Moeschler, Kronfoerstchen bei Bautzen.

Mr. Stretch in his valuable work "Illustrations of Zygænidæ and Bombycidæ of North America" describes three species of *Utetheisa*, viz: *bella* Linn., *speciosa* Walker, and *ornatrix* Linn. Besides this he mentions a fourth species or variety, and he gives beautiful figures of all. The author is doubtful whether these forms are specifically distinct, or merely varieties of one species.

It seems indeed difficult to decide this question, for the preparatory stages of *bella* alone are known. But even if known, the larvæ might differ in size and color without proving the distinctness of the imago, for the larva of a species often varies under the influence of food and climate.

I shall attempt to clear the subject as far as possible at present, and detail the descriptions: Linne described two species, *bella* and *ornatrix*, placing them in the Noctuidæ. Cramer also describes and figures them, but he mistook *bella*, and mixed two species under this name, that form being figured as *bella*, which Walker afterwards described as *speciosa*. Cramer says, Vol. II, p. 20, "Le fond des ailes superieures des males est pour l'ordinaire d'une jaune obscure ou orange, tandisque les femelles comme celle nous representons ici, ont ce fond rouge. On le trouve dans l'amerique meridionale, a la New York, et dans l' Isle Jamaique." This description proves that Cramer saw only males of the yellow *bella* and females of the red *speciosa*. It seems also that later authors, Hübner, Herrich-Schaeffer, Walker and Stretch, have not compared Cramer's description and figures of *bella* otherwise they would not have cited pl. 109, f. C, D, as *bella* L. It is most strange that Walker has not cleared up this matter, for he describes the form figured by Cramer as a new species under the name *speciosa*, and yet cites the figure with *bella* L.

If we compare only a few specimens of these two species, and of *ornatrix* there seems to be considerable difference between them; but with a great number of specimens for comparison there are specimens grading from one into the other. My friend Dr. Staudinger was kind enough to send me all the specimens of his rich collection for comparison, and these with my own collection gave 35 examples for comparison, viz: 10 *bella*, 22 *speciosa*, and 20 *ornatrix* from various parts of North and South America and the West Indies.

I compare *bella* from the United States, and from Cuba, *speciosa* from Cuba, St. Domingo and Jamaica W. I., and *ornatrix* from Panama, St. Croix, and St. Kitts, W. I., Surinam, Columbia and Peru.

If we carefully compare the three species we will observe certain peculiarities of maculation common to all, viz: primaries having four black dots at the costa, extended to rows of dots in *bella* and *speciosa*; a

subterminal row of black dots, a similar series at the outer margin, and two black spots near the tip of the wing. Beneath, the primaries are deep red with three black spots at the costa, sometimes appearing as broken bands, an interrupted black subterminal band crosses the wing, and there is a row of black dots at the outer margin. Secondaries with a narrow or wide black outer margin, widest at the apex where it incloses a white or pale red spot, and having usually an inward dilation of this black margin beyond the middle. Palpi, head, thorax, and abdomen white, the former with black spots, the abdomen unspotted above, beneath with two rows of black dots. Prothorax and pategia with a yellow or red spot on each side. The differences between these species are that *bella* has yellow primaries with six transverse bands, each containing a series of black dots, while *speciosa* is vermillion, the bands as in *bella*. The secondaries of these two species are pink. *Ornatrix* has pale flesh colored primaries, the costa narrowly and interruptedly vermillion, the pale spaces with black costal dots, and there are also usually two black dots beyond the middle of the wing: these are, however sometimes wanting. The subterminal row of dots is in an obsolete white band, and between that and the series of dots at the outer margin, is a narrow broken band of vermilion. Beneath, the primaries are as in *bella* and *speciosa*. Secondaries white, the black outer margin generally very wide. Beneath the costa is pink.

It does not seem to be doubtful that here are three specifically distinct forms, should the differences be constant; but as already mentioned, there are specimens which prove that these species merge one into the other. These I shall describe as far as I can compare them.

All specimens from the United States which I saw were true *bella*, but a specimen from Cuba varies toward *speciosa* in that the primaries show rosy hue. The second example from Cuba is most interesting for it at once merges *speciosa* and *ornatrix*. The primaries are white with a rosy hue; the first and fourth bands only are perfect and run to the inner margin; the second and third only as costal spots, and all are yellow with a slight reddish hue, as is the stripe near the outer margin.

Secondaries partly rosy, partly white, the latter color near the hind margin. This specimen approaches Stretch's fig. 17 of pl. II, but the spots of the primaries are yellow, not red, and the secondaries have the black outer margin more narrow, and the rosy hue more extensive.

The examples of *speciosa* from the West Indies vary considerably: some have vermillion primaries and sharply limited white bands, while others have white primaries with small and obsolete red bands, and sometimes the bands are broken into spots.

With regard to *ornatrix*, all examples from the mainland are true to type, and vary very little,—specimens from Peru only showing a more

dusky tint. But the examples from the West Indies seem to run more or less into *speciosa*. There are specimens from St. Croix and St. Kitts, different only from the South American *ornatrix* by the beginning of red longitudinal stripes on the primaries, while others show these stripes wider and broader, until the red color is extended by degrees over the whole wing.

The most striking specimen, from St. Croix, has quite red primaries, the base is white, three sharply defined white bands run from costa to middle of wing, the subterminal white band is distinct, all the bands contain black spots, and there are also a few white, rounded spots; one opposite the first band, near the inner margin; one opposite the second band in the middle of the wing, and 2 smaller spots, enclosing black dots between the third and s.t. band. Secondaries white, with black outer margin as in *ornatrix*. There is no doubt that these examples are transitions from *ornatrix* to *speciosa*. It is a fact well known to Entomologists, that the insular climate influences the size and color of some insects; and this seems to take place with these species to a considerable degree. *Bella* seems to be the Northern form which flies from the Atlantic States to Texas, where it is replaced by *ornatrix*, the Southern form, and this reaches into South America, and also appears in the West Indies But it is variable in the small Islands, and fluctuates more or less between the mainland form, and the insular *speciosa*.

Speciosa is the insular form and remains constant in the largest Islands, becoming variable in the smaller ones, and there it sometimes merges into *bella*. Among the specimens of *speciosa* in Dr. Staudinger's collection, there are two labeled "Bogota". They are collected by Baron von Nolken, and it seems doubtful whether this labelling is correct, because neither Dr. Staudinger nor myself ever got *speciosa* from South America. Mr. Nolken on his way to Bogota also collected in Jamaica, and it is possible that these two specimens were caught in this Island and not in South America, and that the labelling was done by mistake.

Finally I shall attempt to rectify the synonomy of this species, for Linne described *ornatrix* before *bella*, and the former name must be accepted for the species and *bella* must be applied as one of its varieties.

U. ornatrix Linn. Syst. Nat. p. 837 (1767); Fab.; Drury; Hb.; Westwood; Wlk., List 567; Stretch, Illustr., p. 56, Pl. II, fig. 18.

Habitat: Texas, Mexico, West Indies, South America.

Var. **bella** Linn. Syst. Nat. p. 885 (1767); Fab.; Dru.; Westwood; Morris; Harris; Packard; Grote; Cramer, Vol. II, p. 20, (in part); Wlk., List, p. 568; Stretch, Illustr., p, 56, Pl. II, fig. 15.

Habitat: N. Amer., Canada to Texas, Cuba, W. Ind. (merging into *speciosa*).

Var. **speciosa** Wlk., List, p. 568 (1854); Clem., Syn. Lep. North Am., app. p. 314 (1862); Stretch, Illustr., p. 57, Pl. II, fig. 16; *bella* Cram., Vol. III, p. 20 (in part), Pl. 109, figs. C.D. (1779); Hb. Verz., p. 168 (1816).

Notes on Hylesinus aculeatus and Phloeosinus dentatus.

By Warren Knaus. Salina, Kansas.

The *Scolytidæ* are but sparsely represented in the coleopterous fauna of Kansas. This scarcity is accounted for in great part by the absence of forests over the greater part of the State; the natural home of these Coleoptera being beneath the bark of shrubs and trees, where a large part of the imaginal, and the whole of the larval life is passed.

Of the seven or eight species of this family in this State, as given in the various Reports of the Kansas Academy of Science, but three have come under my personal observation, and but one (*P. dentatus*) has actually been observed at work.

The burrows of a *Scolytid* in an ash post, which I supposed was the work of the "Ash Bark Borer", came under my observation about one year ago. The work however, was not recent and no specimens were obtained. Specimens of the sculpture were retained, but efforts to find more recent work were not successful until about the middle of July, 1885, when I secured well preserved specimens, though dead, of an insect, from ash posts, near Stockton, Rooks County, and Edmond, Norten County. These specimens proved on identification to be *Hylesinus aculeatus* Say. No growing trees were found which had been attacked, and those only were selected that were already in a decaying condition.

The burrows of this insect were almost facsimiles in every particular, consisting of a larger central channel from 25 to 100 mm. in length and 1 mm. in width, made by the female, the young larvæ eating its way outward from this channel, the larval channels constantly enlarging during the larval life, and sinking a little deeper in the wood as the pupa state is reached. These larval channels are from 5 to 45 mm. in length and from $\frac{1}{3}$ to 1 mm. in width. The central channel is usually slightly sinuous, being governed to some extent by the surface of the wood and the number of beetles at work, they never coming in contact. At about midway of the central channel there is in every instance a change of direction,—a curve, sometimes hardly perceptible, at other times and usually, very marked. The lateral larval channels extend outward at right angles from the central channel, and are about one third the length of the former, that varying from one to three inches in length.

In November 1885, live specimens of this insect were taken from ash trees in the western part of Davis County. The bark of these trees had apparently been abraded about a month previous, and had been at once attacked by *Hylesinus aculeatns*. Large numbers of these had

eaten their way from ¼ to 1 inch under the bark from point of entrance and had gone into winter quarters.

Probably the most destructive bark borer known in this State is the *Phlœosinus dentatus* Say. Its attacks, so far as observed,—are confined to the evergreens,—junipers and arbor vitæ.

This insect was first noticed in Salina the summer and fall of 1884, attacking the junipers on the grounds of a number of the residents of the city. They were then in great numbers, many trees having been entirely destroyed, and others badly injured. The damage was done entirely by the perfect beetle, no larvæ having been observed. The injury was almost invariably confined to the base of the lateral offshoots of the branches of the tree, the beetle burrowing under the bark, and eating around the base of the twig, causing its destruction. Every twig from the trunk outward would be attacked, and a few burrows were also observed on the stems or trunks of the trees themselves. No primary gallery of the perfect insect has been found to exceed three-quarters of an inch in length. I have found no secondary or larval galleries.

Packard, in his "Insects Injurious to Forest and Shade Trees" says he has observed this insect as early as the 1st of May. I have never observed it making attacks earlier than the 1st of September, continuing until the latter part of October.

The attacks of this insect are made on healthy trees, and I have seen no less than fifteen cedars entirely killed in the Public Square of Clay Center, Kansas, that would average six inches in diameter at the base. This *Scolytid* is not a native, but has been introduced in cedar posts brought to the lumber yards from Michigan and Arkansas. I have examined posts from Arkansas which contained the perfect beetle, (but dead), larvæ, and pupæ. When these pupæ had completed their transformations, cedars in close proximity to the lumber yard were at once liable to attack.

The primary gallery of this insect as examined in Arkansas cedars is short and straight, being from 18 to 25 mm. in length, and 3 mm. in width, The gallery widens at one end into a trilobed chamber twice as wide as the main gallery. The number of lateral or secondary galleries on each side varies from 15 to 60. These secondary galleries are from ½ to 1 mm. in width, and those arising near the ends of the main gallery are about 45 mm. in length; those arising near the middle are about one half as long.

The burrows are about one half in the wood and one half in the bark. The secondary galleries rarely cross each other, and when they do, it is owing to some inequality in the surface of the wood, or the close proximity of the burrows.

This bark borer is not without its enemies. I found fully one half the pupæ cases examined, contained nothing but the remains of a parasite that had destroyed the pupa, and had itself failed to escape. The perfect fly was also seen passing over the surface of the bark, seeking a favorable point to make an attack on her victim. Specimens of this fly were sent to Mr. L. O. Howard, Assistant U.S. Entomologist, who pronounced it a *Chalcid* fly belonging to the genus *Spathius*.

FOOD-PLANTS OF LEPIDOPTERA. *No. 4.*

(Datana ministra, *Dru.*)

By Wm. Beutenmüller.

Tiliaceæ.

Tilia Americana, L. (Basswood.)
" heterophylla, Vent. (White Basswood.)
" Europaea, L. (European Linden.)
" alba, Waldst & Kit. (White Linden.)

Rosaceæ.

Prunus cerasus, Juss. (Common Garden Cherry.)
Pyrus malus, Tourn. (Common Apple)
Cydonia vulgaris, Pers. (" Quince.)

Juglandaceæ.

Juglans cinerea, L. (Butternut.)
" nigra, L. (Black Walnut.)
Carya alba. Nutt. (Shell Bark Hickory)
" microcarpa, Nutt. (Small Fruited Hickory.)
" sulcata, Nutt. (Western Shell Bark Hickory.)
" amara, Nutt. (Bitter Nut Hickory.)
" porcina, Nutt. (Pig-nut Hickory)

Cupuliferæ.

Quercus alba, L. (White Oak.)
" obtusiloba, Michx. (Obtuse-leaved Oak.)
" macrocarpa, Michx. (Mossy-cup Oak.)
" coccinea, Wang. (Scarlet Oak.)
" rubra, L. (Red Oak).
Quercus palustris, Du Roi. (Pin Oak.)
" pedunculata, Willd. (English Oak.)
" sessiliflora, Sal. (The Sessil-flowered Oak.)
" Cerris, Linn. (Turkey Oak.)
Castania vesca, Gaert. (European Chestnut.)
" " v. Americana, De Cand. (American Chestnut.)
" pumila, Mil. (Chinquapin.)
Fagus ferruginea, Ait. (Red Beech.)
" sylvatica, L. (European Wood Beech.)
" " var. purpurea, Ait. (Purple Beech.)
" " " cuprea, Lodd. (Copper Beech.)
" " " laciniata, Lodd. (Cut leaved Beech.)
Corylus Americana, Walt. (American Hazel.)
" avellana, L. (European Hazel.)
Carpinus Americana, Michx. (Horn beam.

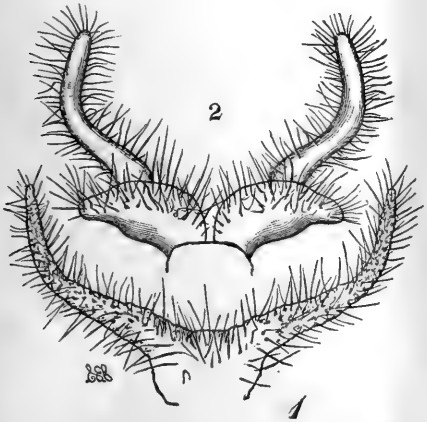
Betulaceæ.

Betula alba, L. (White Birch.)
" var. populifolia, Spach. (Am. White Birch,)
" papyracea, Ait. (Paper Birch.)

Scent-Organs in some Bombycid Moths.

By John B. Smith.

At intervals during the past year or two, isolated observations have been made of peculiar filamentary processes protruding from the abdomen of the male of some of our common bombycids, *Leucarctia acræa* and *Scepsis fulvicollis* being the observed species. Not long since, I described a peculiar abdominal character in the male of *Cosmosoma omphale*; and the recent capture and examination of specimens of *Leucarctia acræa* has enabled me to add something to the knowledge of the structure in that species. Between the seventh and eighth ventral segments is a narrow opening, entirely invisible in the dried insects, but readily discerned on a slight pressure of the abdomen in the fresh specimen. This opening extends back about an eighth of an inch, and, on being carefully pried open, shows two closely folded tufts of fine blackish hair. Pressure upon the abdomen will generally force out these tufts, and, if rightly applied, will result in the extension of two orange tentacle like structures, fully half an inch in length, united at the base, and spreading backward and outwardly in a gentle curve. The tufts of hair diminish as the tentacles are extended, the individual hairs occupying small but distinct papillæ on the sides, until, when fully extended, they are evenly distributed around them, and no trace of the brush-like tuft remains. If the pressure be removed, the tentacles contract, the hairs again forming a tuft.



1. *Leucarctia acraea.* 2. *Pyrrhaitia isabella.*

Specimens of *Pyrrharctia isabella.* when closely examined, showed a similiar abdominal structure; but here there were four tufts extended instead of two, and in color they were snow-white. Properly applied pressure resulted in the inflation, first, of two basal sacs, which, when fully dilated, could be compared to nothing better than the ends of two thumbs pointing in opposite directions, the hairs of two of the tufts arranged rather densely on the convex outer surface. From the middle of the lower edge of these sacs there extended two tentacles similar to those in *acræa,* but not so long; and instead of being evenly clothed with hair, in this species the

lower portion only has the papillæ and hairy surface. The sacs and tentacles here are whitish, instead of orange, as in *acræa*. The processes of the latter species have a most remarkable resemblance to the tentacles of the larva of *Papilio asterias*, both in color and in shape. In both species an intense odor, somewhat like the smell of laudanum, is apparent when first the tentacles are exposed; and there is no reasonable doubt but that they are odor-glands, though exactly what purpose they serve is not so clear. In closely allied species no trace of this structure has been detected. Several fresh specimens of several species of *Arctia, Spilosoma virginica*, and *Hyphantria textor* showed no trace of it; and no dry specimens of any other species thus far examined have a similar structure.

Some years ago Mr. Morrison observed and described the structure in *acræa* and mentions having found similar structures in *Agrotis plecta* and *Euplexia lucipara*. This I have not been able to verify. Prof. Riley has described similar structures in *Aletia xylina*, and probably a considerable number of other species will be found to have them.

Notes on Geotrypes Opacus, *Hald.*

By Alfred W. Jones, Salina, Kans.

I do not know as to the relative rarity of this species, but from the fact of always finding a ready exchange for it, I suppose it is not very common.

I have almost always taken it, where I have found no other scavengers at work, except *Aphodius*, and a few *Staphylinus* perhaps, and I have always taken it either very early in spring or late in the fall.

Generally I have taken it on low bottom land, or on sand bars in the river, where cattle are wont to drink: here I have taken most of the specimens, and I have taken them at the very water's edge where they had burrowed down into sand that was saturated with water. But I never found more than three or four in one place until last November, when in company with Mr. Warren Knaus, I drove to Manhattan and back from Salina. On our trip going down I saw a specimen crawling along in the road, and stopping to get it, I observed some fresh manure which yielded several specimens. Thinking we had procured all of them, we drove on, but returning about a week later we stopped to examine the very same place, and though at first it appeared as if it were a useless search, Mr. Knaus said that he saw several burrows going down into the sand and meant to find out what was there. He dug down nearly a foot with no success before he threw out one, and then in a few minutes we had eleven specimens in the Cyanide bottle.

Synopses of Cerambycidae.

By Chas. W. Leng, B.S.

(Continued from p. 63.)

TRAGIDION, *Serv.*

Contains three species in which the prothorax is moderately punctured and the scutellum small, broad y triangular, almost rounded. The thorax and elytra are conspicuously pubescent concealing the punctures.

SYNOPSIS OF TRAGIDION.

Elytra sulcate.
Hind tarsi wider; antennæ annulate..... **annulatum.**
Hind tarsi narrower, antennæ black..... ..... **coquus.**
Elytra even, not sulcate.....**armatum.**

T. annulatum Lec. Proc. Acad. Phil. 1858, p. 83. Length .80 in. = 20 mm. Hab. Arizona, Cal., Texas, N. Mex.

Black, antennæ yellow with scape and tip of each joint black, elytra densely clothed with fulvous pubescence, basal line and humeri black. (Pl, III, f. 10.)

T. coquus, Linn. Syst. Nat. ed. X, p. 393; Lec. J. A. P. ser. 2, II, 1850, p. 10; *lynceum* Fab. Syst, Ent. p. 191; Oliv. Ent, IV, 67, p. 37, t. 14. f. 97- Casteln Hist. Nat. II. p. 452; *Melsheimeri* Germ, Ins. Spec. nov. p. 502. Length .60 in.= 15 mm. Hab. Atlantic and Southern States, Tex., Col.

Var. fulvipenne Say, Journ. Ac. Phil. III, 1823, p. 414; Lec. Journ. Ac. P. ser. 2, II, p. 10. Length 1 in. = 25 mm. Hab. Ills., Col., N. J., Utah, La., Mo., Tex. Arkansas.

T. coquus is entirely black except a spot of orange on each elytron near the base,

T. fulvipenne is larger and the elytra are entirely clothed with fulvous hair.

A specimen in the collection of Mr. H. W. Wenzel, has the elytra suffused with black, except where the spots occur in *coquus*, presenting a form precisely intermediate.

It is now considered a variety of *coquus.*

T. armatum Lec. J. A. P. V, 1, 1858, p. 25; Lacord. Gen. Col. IX, 1869, p. 174. not. Length 1 in. = 25 mm. Hab. California, Texas.

Color as in *annulatum,* but the elytra are smooth and the lateral spine of thorax is even more marked than in the other species of the genus.

PURPURICENUS, *Serv.*

Thorax coarsely punctured with a small lateral spine. Scutellum moderate, broadly triangular, acute at tip. Elytra not pubescent.

SYNOPSIS OF PURPURICENUS.

Thorax entirely black..... **humeralis.**
Thorax black, disk red..... ..... **dimidiatus.**

P. humeralis Fab. Ent. Syst. Suppl. p. 143; Bland, Proc. Ent. Soc. Phil. I, 1862, p. 276. var. Length .50–.64 in.=13–16 mm. Hab. Atlantic States, Ohio to Mo.

Entirely black except the elytra, which bear a reddish humeral space, defined by a line running from scutellum to middle of outer margin. (Pl. II, fig. 11.)

Variety *axillaris* Hald. Trans. Am. Phil. X, 1847, p. 31; Lec. J. A. P. ser. 2. II, p. 11, N.Y., Pa., Texas. Mass.

The red space is larger and the punctuation not so coarse.

P. dimidiatus Lec. Trans. Am. Ent. Soc. XII, p. 23. Length .72 in.=18mm. Hab. Yreka Cal.

Black except disk of thorax and anterior half of elytra. Punctuation also more coarse than in *humeralis*.

METALEPTUS, *Bates.*

This genus, recently added to our list by the occurrence of two species in Arizona and Southern California, is allied to *Purpuricenus* and differs in the absence of antennal tubercles in ♂ and in the pubescent surface. Two species may be separated thus:

Apices of elytra conjointly rounded; more coarsely punctured ..... **Batesi.**
Apices of elytra sinuously truncate; less coarsely punctured..... **angulatus.**

M. Batesi Horn Trans. Am. Ent. Soc. XII, p. 174. Length .40–.52 in. =10–13 mm. Hab. Arizona.

Black, sparsely clothed with gray pubescence, elytra at base and entire lateral margin red.

M. angulatus Chev. Col. Mex. Cent. I, f. 4, n. 83. Length .40–52 in. = 10–13 mm. Hab. Mexico, So. Cal.

To be distinguished only by characters of table above. (Pl. II, f. 12)

AETHECERUS, *Chev.*

Thorax finely punctured; scutellum small, rounded at tip. The following synopsis is extracted from Dr. Horn's paper, Trans. Am. Ent. Soc. VIII, 1880, p. 133, where a full discussion of this and other genera may be found.

SYNOPSIS OF AETHECERUS.

Thorax broader than long; elytra truncate at tip.
Elytra feebly shining, the punctures near the apex not densely placed; thorax not maculate..... .....**Wilsonii.**
Elytra opaque, punctures near apex very fine and densely placed; thorax with two discal black spots..... ..... **Hornii.**
Thorax as long as broad, elytra rounded at tip..... **latecinctus.**

A. Wilsonii Horn Proc. Ac. Phil. 1860, p, 570, pl. VIII, fig. 4. Length .60 in.=15 mm. Hab. Ariz., Texas.

A. Hornii Lec. Gen. Col. IX, p. 184. Length .60 in. = 15 mm. Hab. Fla.

A. latecinctus Horn Trans. Am. Ent. Soc. VIII, p, 134. Length .40–.60 in. = 10–15 mm. Hab. Arizona. (Pl. II, fig. 13.)

MANNOPHORUS, *Lec.*

The thorax is closely and moderately coarsely punctate and the scutellum is moderately large, broadly triangular and nearly round behind.

M. laetus Lec, Proc. Ac. Phil. VI, 1853, p. 442. Length .5–.6 in.=13–15 mm. Hab. Texas.

Black, beneath sparsely pubescent, above not at all, thorax red, elytra black or bluish black, densely punctate with two yellow elevated lines on each. Varieties occur with lines shortened and with a black spot on thorax. (Pl. II, fig. 14.)

A variety has recently appeared on the Mexican Boundary in Texas having the elevated lines of elytra black, smooth like the typical form but without a trace of usual color.

ENTOMOSTERNA, *Chev.*

Closely resembling the preceeding in form and *Ischnocnemis* in coloration of elytra. The thorax is however rounded on the sides and not narrowed in front, and is blue in color, quite bright in fresh specimens, nearly black in old specimens. The vittæ of elytra are quite as bright as in *Ischnocnemis.*

E. cyanicollis Dup. Mag. Zool. 1838, Cl. IX, p. 59, t. 220, f. 2; Lacord. Gen. Col, IX, 1869, p. 184, not. 3. Length .5–.6 in.=13–15 mm. Hab. Tex. Ariz.

AMANNUS, *Lec.*

The characters of this genus have been well defined in the table of genera. The species are as follows:

Black, beneath gray, abdomen with shining denuded spots..... .. **vittiger.**
Black, beneath testaceous except postpectus and legs black; femora testaceous at base..... .....**pectoralis.**

A. vittiger Lec. J. A. P. ser. 2, II, p. 24. Length .43 in. = 11mm. Hab. Llano Estacado, Texas and New Mexico.

This insect is entirely clothed with pale pubescence except as indicated above, and on the elytra which bear a narrow black dorsal vitta abbreviated in front and have the suture and margin also blackish. The thorax is punctured except an obsolete dorsal callus, and is narrowed in front and rounded on sides. The elytra are closely punctured, obsoletely bicostate and broadly truncate at apex.

A. pectoralis Lec. l. c. Length .27 ins.= 8 mm. Hab. Fort Yuma Cal. Col.

The head is variegated with piceous, the vitta of the elytra testaceous, clouded behind, and the the lateral margin fuliginose. The thorax is cylindrical and the apices of elytra separately rounded. The general appearance of the species of this genus suggests *Sphaenothecus.*

(To be continued.)

Society News.

Brooklyn Entomological Society. June 2d, 1886.—Twelve members present. Mr. E. A. Schwarz, of Washington was proposed as a member of the Society by Mr. Smith and on motion was duly elected. Mr. Hulst read a short extract from a paper by Prof. Fernald, recommending for sugaring molasses only, without any admixture of beer or rum. Mr. Weeks read a paper from Mr. H. B. Moeschler, on the American species of *Utetheisa,** and another from Mr. J. B. Smith on some peculiar characters in some ♂ *Arctiids.*† He also read a short note on his experience in collecting under decayed turnips, and a life history of *Botis erectalis*. After some general discussion and exhibitions of specimens the meeting adjourned until September.

Entomological Society of Washington. June 3, 1886. Mr. Smith exhibited male specimens of *Leucarctia acraea* and *Pyrrharctia isabella* with a peculiar inflated process extruded between the 7th and 8th ventral segments of the abdomen and described the structure and how discovered.**

Mr. Schwarz spoke on an observation made by Mr. Smith and himself during the month of April in régard to a new food-plant *Pieris rapæ;* egg and young larvæ having been found on *Barbarea vulgaris*. He thinks that the first annual generation of this *Pieris* is passed upon some wild Cruciferous plant and that *Barbarea vulgaris* will be found to be one of the principal food-plants of the larvae thus early in the season.

Mr. Lugger made some remarks on introduced Coleoptera. A few specimens of the European *Aphodius erraticus* were first found by him in 1878 in the droppings of the Virginia Deer in Druid Hill Park, Baltimore, Md. Since that time the species has spread and is now so common in all sorts of excrements that it has actually replaced the formerly common *A. fimetarius*. A specimen of *Agra ænea*, a native of Surinam and a number of South American Cerambycidæ were found at Baltimore, but invariably in the vicinity of the wharfs.

Mr. Lugger further described the fertilization of the common Lady's Slipper *Cypripedium acaule* by a species of Andrena, and also mentioned the fact that the seeds of the Hard Maple, so numerous in the Smithsonian Grounds, were this year uniformly sterile. He attributes this phenomenon to the inclement weather during the flowering season which prevented bees from visiting the flowers.

A number of smaller communications followed: Mr. Lugger on a case of faulty instinct in a Tachina fly which had oviposited upon the hard body of *Rhodobænus* 13-*punctatus;* Dr. Marx on the occurance of the European *Epeira diadema*ta in Minnesota, Mr. Howard on the muscular force exhibited by a species of Canthon; Mr. Schwarz on the abundance of several species of Lachnosterna during the present season, and on the Braconid parasite of *Pissodes strobi*; Mr. Howard on *Epicauta cinerea* being attracted by light; Mr. Smith on the blistering power of one of our common Meloids.

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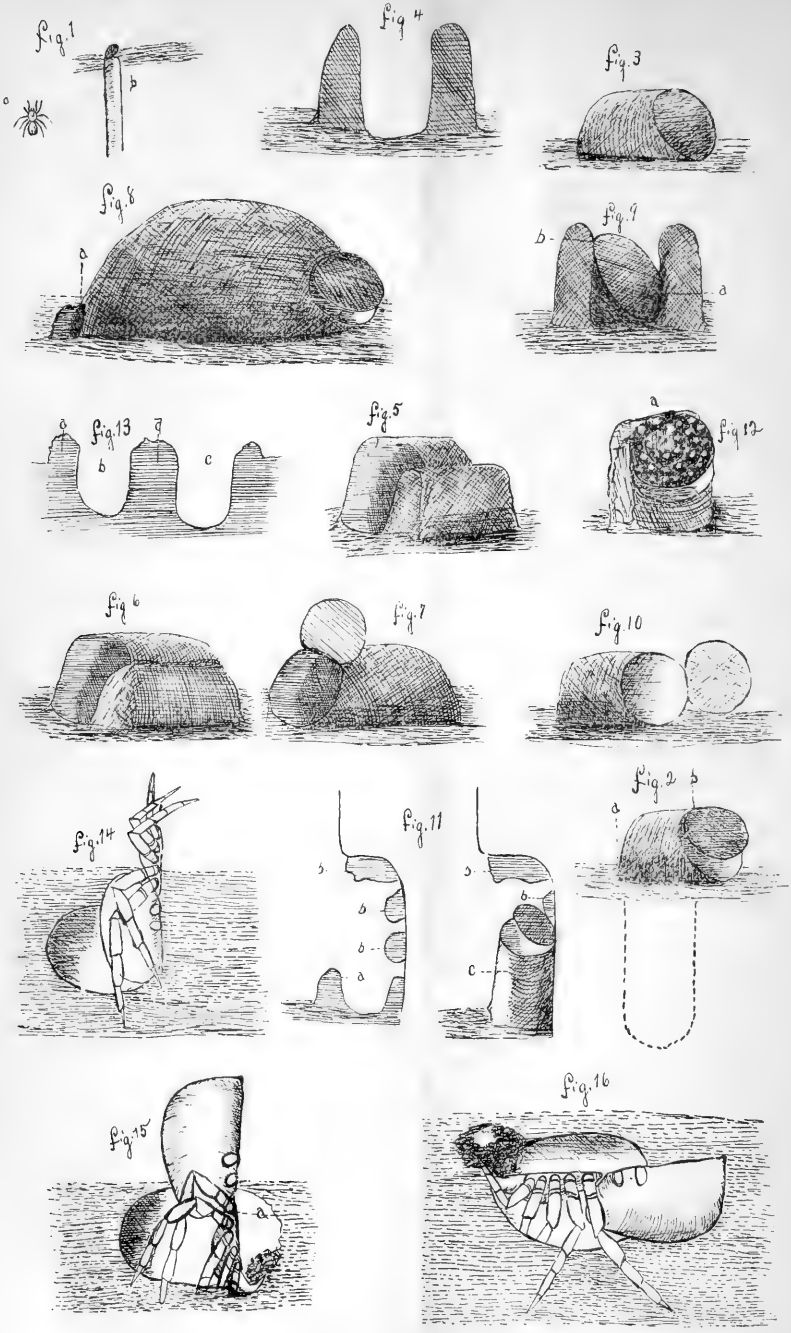
* See ante p. 65. † See ante p. 79.

** For more detailed description and figures see p. 79 ante,



Geo F. Atkinson; from nature.

ENTOMOLOGICA AMERICANA

VOL. II. BROOKLYN, AUGUST, 1886. NO. 5.

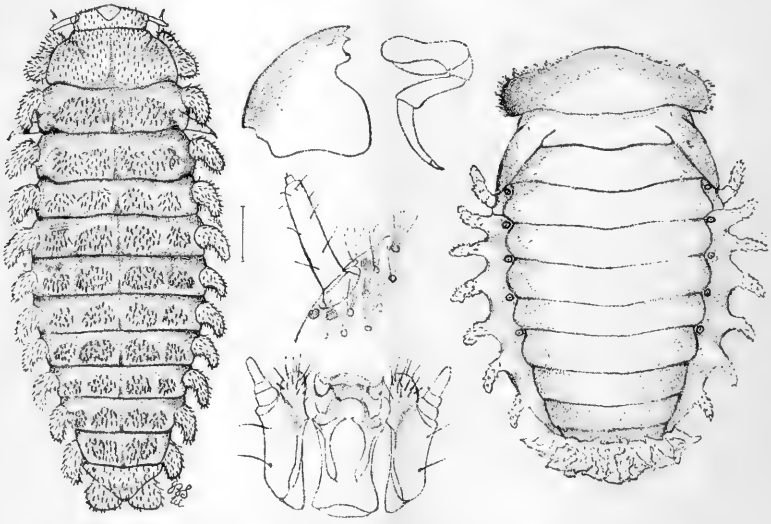
Larva of Aphorista Vittata, *Fabr.*

By JOHN B. SMITH.

Early in November 1885, Mr. E. A Schwarz and myself while collecting in Virginia found under a decaying log a number of larvæ feeding upon a mould fungus. Close search revealed a few very fresh specimens of *Aphorista* (*Mycetina*) *vittata*, and as the larva agreed closely with that of *Epipocus discoidalis* in Dr. Riley's collection which Mr. Schwarz had collected in Texas, it was assumed that the larva was that of *A. vittata*—a supposition which was verified by afterward obtaining the pupa, though none were found at this time.

Larva of all sizes were found, the largest—mature as it proved—about 8 mm. in length, and, as they appeared with retracted head and somewhat curled, about half as broad as long. They were of a dirty blackish brown color above, dirty yellowish white beneath, flattened though yet rather stout. and furnished at the sides of abdomen with a double row of lateral appendages, the upper dorsal, but at the extreme side of the segment; the lower ventral: the stigmata are situated between these appendages. The thoracic segments have only one of these lateral appendages, as has also the anal segment. The form of these appendages and their proportion and situation are well enough shown by the accompanying figure, and require no detailed description. The head is small, retracted, and usually not visible from above, in the living insect. The antennæ are short with a small thick socket joint, a very short 2nd joint, a long, cylindrical, somewhat tapering terminal joint, which is furnished with a few scattered hairs, and has at tip a small tubercle, making really a fourth joint. Ocelli, three on each side; one before, and two

behind the base of the antennæ. The mouth parts are proportionately very small, and so sunken that they are difficult to dissect out. The figure will render detailed description unnecessary. The maxillæ in the figure are separated from the labrum: naturally, they are bent inward above, so that only the palpi are visible. The maxillæ are rather sparingly clothed with rather thick bristles diverging to all sides; the palpi are three jointed, the basal joint very thick and short, the second still shorter and not so thick, the 3d longer than the other two combined and much more slender. The labial palpi are two jointed, the terminal joint obliquely truncate. The head is equally and somewhat sparsely covered with punctures from each of which arises a bunch of hair spreading fan-like toward the tip, as shown in the figure. The lateral appendages are densely clothed with the same fan-like hair tufts, inserted also in distinct punctures. The pro-thorax above is covered in the same way, except near the base and in the depressed central furrow. The meso-, and meta-thorax have on each side a somewhat depressed, harder, more shining scute or plate, also punctured and furnished in the same way with hair tufts. The abdominal segments except the 8th and 9th have each two smaller, ovate scutes of the same nature, each side of the middle. On the 8th segment the scutes are confluent, and cover a greater part of the surface. The 9th segment is equally punctured and furnished with spreading setæ.



The segments are well marked, the sutures being deep, so that when the insect is placed flat, they look like deep incisions, the sides declivous.

Except the head and terminal segment, all others have a distinct longitudinal furrow, deepest at the posterior portion. Except where punctured as shown in the figure, the upper surface is finely rugose or shagreened.

The figures will supply all details omitted here, better than descriptive terms can do; the interesting peculiar features being the lateral appendages and the spreading tufts of hair arising from distinct punctures. What purpose do they serve?

The pupa is equally peculiar, and is sufficiently described by the figure. It is white, with a very faint yellowish tinge, the elytra tucked in beneath the fore and median legs and over the posterior pair.

A Family of young trap-door Spiders.

(Fachylomerus carolinensis, *Hentz.*)

By Geo. F. Atkinson.

Two questions were asked by Mr. Moggridge about the habits of young trap-door spiders. For the answer to these he was unable to make any observations, so far as the record shows. The questions are; 1st, do young trap-door spiders make nests like those of the parent without being shown? 2nd, do the males of trap-door spiders make a nest with a trap-door when very young? To the first question we would almost unhesitatingly reply in the affirmative, without direct observation. In regard to the second, it is well known by those who have given much attention to the habits of trap-door spiders, that the mature males, at least, do not build trap-door nests, but seek a hiding place under stones, logs, etc.

There is also another question as to the constancy with which species follow a *uniform type* in the construction of their nests. Some naturalists make the different kinds of nests a partial basis for classification, and others are looking for different characters manifested in the variations of the trap-door; whether the door is horizontal; the hinge lower or higher than the distal part of the door; or the door sloping one side, etc.

The object of this paper is to present the variations produced by a family of 28 young trap-door spiders, in the building of their nests, which I have carefully observed and noted. I trust also to show that, from the labors of these little creatures, and of several mature ones, which I have had in captivity, a great deal of light is thrown on the questions stated above.

The family was captured by D. E. Woodly, Student, at Chapel Hill, N. C, March 17, 1886, The mother had either deserted her children, or had met with her death. The tube was doorless and near a decaying stump. The 28 children were living peacefully together in the silken cocoon which had contained the eggs at the bottom of the tube. After keeping them together in a small vial for one day, I prepared a bottle of earth for each one. The bottles measure 1½ inches in diame- by thee inches deep. In each about 1½ inches in depth of earth was placed. The earth was moist, loose, but smoothed over and gently packed to furnish a smooth surface for operations.

The following table shows the time of beginning and completion of the work of each. In column 4 is given the time when the work began which was carried to completion. Some began work earlier than here indicated but abandoned it.

1	2	3	4	5	6
No.	Date Mar. '86.	Time placed in bottle.	Time when work began.	Time when trap-door was begun.	Time when trap-door was competed
1	18	5 p. m.	Unobserved.	Unobserved.	Unobserved.
2	18	5 p. m.	"	"	"
3	18	5 p. m.	"	"	"
			Mar. 19, 3.30 a.m.	5 a. m.	5.15 a. m.*
4	18	5 p. m.	" 19, 12.30 a.m	1 a. m.	2 a. m.
5	18	5 p. m.	" 19, 2.30 a.m.	4.20 a. m,	5 a. m.
6	18	10.30 p. m.	" 18, 11.15 a.m	Mar. 19, 12.30 a.m	1 a. m.
				" 19, 3.55 a.m.	4.20 a. m.*
7	18	10.30 p. m.	11.30 p, m.	" 19, 12.30 a.m	2.30 a. m.
8	18	10.30 p. m.	Mar. 19, 12.30 a.m	3.20 a. m.	4 a. m.
9	18	10.30 p. m.	" 19, 2 a. m.	3.20 a. m.	4 a. m.
10	18	10.30 p. m.	" 19, 7 a. m.	9 a. m.	10 a. m.
11	19	4.10 p. m.	4.15 a. m.	5.55 p. m.	7.30 p. m.
12	19	4.10 p. m.	Mar. 20, 11 a. m.	Unobserved.	2.30 p. m.
13	19	4.10 p. m.	" 19, 4.30 p.m.	5.50 p. m.	6.30 p. m.
14	19	4.10 p. m.	" 20, 10 a. m.	1 p. m.	2.30 p. m.
15	19	4.10 p. m.	" 19, 5.18 p.m.	Unobserved.	Unobserved.
16	19	4.30 p. m.	5.15 p. m.	6.20 p. m.	Unobserved.
17	19	4.30 p. m.	4.45 p, m.	Unobserved.	Unobserved.
18	19	4.30 p. m.	5.10 p. m.	5.50 p. m.	6.30 p. m.
19	19	6.30 p. m.	7.50 p. m.	9.15 p. m.	Unobserved.
20	19	6.30 p. m.	Unobserved.	Unobserved.	Unobserved.
21	19	6.30 p. m.	"	"	"
22	19	6.30 p. m.	9.20 p. m.	"	"
23	19	9 p. m.	9.50 p. m.	"	"
24	19	9 p. m.	9.25 p. m.	"	"
25	19	9 p. m.	Unobserved.	"	"
26	19	9 p. m.	Mar. 20, 4 p. m.	Not noted.	Not noted.
27	19	9 p. m.	" 21, 10 p. m.	1 p. m.	5 p. m.
28	19	9 p. m.	" 20, 10 p. m.	11 a. m.	11.30 a. m.

* Nest was destroyed and another built.

Variations from the normal type. By the normal type is meant that which seems to be the simplest, most nearly perfect, plan of construct-

ion, is followed by a majority of those observed, and seems to indicate a *natural instinct*, a more potent influence of inherited habit in some, while in others the instinct seems to be latent at first and gradually unfolds with the dawning of consciousness! According to the normal type, the spider takes up pellets of earth with its mandible, and turning around places them upon the soil by the side of the tube, which is being dug; or carries or throws them to a short distance. Occasionally with its spinerets it applies viscid liquid to the pellets and edge of the tube, much as an artificer would alternately place cement and bricks in the construction of a column. The trap-door is built in the same manner, by beginning, at one side of the edge of the hole, a horizontal wall to which particles are cemented and pressed in shape to make a flat, circular, lid to the tube.*

By a study of Plate IV we shall see some of the variations from the normal types. Fig. 1, *a*, represents one of the spiders, natural size, *b*, section of a nest built after the normal type, door represented open, also natural size. All of the other figures, except 15 and 16, are magnified. In fig. 2, one side of tube, *a*, is extended above ground and carried over the tube. The door, represented open, is hinged at *b*; when closed it slopes downwards from the hinge attachment, fig. 3. This was the work of No. 3. The arched wall from *a*, was pressed in shape in the same way that the trap door is, so that when the spider began it at *a*, I thought it had begun the trap-door, and made this entry in my notes. "At 4.30 door begun; two-thirds of the edge used for attachment of the hinge, making an awkward door." When the hinge was made at *b*, it was easy to see the arching of the wall was intentional. In fig. 10, the tube is curved above ground in a similar way, but the hinge is at one of the sloping sides, making a door that swings to the right and left instead of up and down. This was made by No. 25. Figures 4, 5, 6 and 7 represent the work of No. 15. A trench was dug, using the excavated earth for a wall on each side; the walls were then united by an arch over the middle, one end closed and a trap-door made at the other end. Fig. 8, represents the nest of No. 22, built in the same way as that of No. 15, except that at *a*, the hole was not entirely closed. No. 13 built what is shown in fig. 9. A trench with a wall each side was first built; in the middle of the trench was dug the tube and the door hinged at the base of one wall at *a*, with the distal part of the door elevated at *b*. Fig. 11, shows the work of No. 24: a trench was dug by the side of the glass with a wall on one side at *a*; on the other side earth was carried upon the side

* For description and illustration of the building of a nest and trap-door by this species, see Amer. Nat. for July 1886.

of the glass and attached in small lumps at *b*; *c*, represents the nest, a small tower against the glass. Fig. 12, was made by No. 26. This is interesting as being the only one showing the concentric "lines of growth" usually noticed in the doors of nests that have been used for a year or so. No. 14, first dug a shallow hole as represented at *b*, fig. 13; abandoning this it dug another at *c*; it then removed the earth at *d*, making a trench; next it began the tube at *c*. but soon abandoned it, began again at *b*, restored *d*, and completed the nest in the normal way. The following table shows the varying positions of the door when closed.

Horizontal: Nos. 1, 2, 4, 5, 6, 9, 10, 11, 12, 14, 16, 18, 19, 20, 21, 23, 27, 28.

Sloping downward from hinge attachment: Nos. 3, 7, 8, 15, 17, 22, 24, 26.

Rising from hinge attachment: No. 13.

Sloping door with hinge at one side: No. 25.

Table showing the kinds of nests.

Curved tube: Nos. 3, 8, 25.

Straight tube: Nos. 1, 2, 4, 5, 6, 9, 10, 11, 12, 13, 14, 16, 18, 19, 20, 21, 23, 24, 26, 27, 28.

Trench with arched walls: Nos. 7, 15, 17, 22.

Nests of mature spiders, of this species, made in captivity present some of the variations mentioned above, as also some of the nests found in a state of nature.

One of the most interesting things which came under my observation during the work of these spiders was the varying potency of instinct manifested in the aptness with which each performed the task of building its home. This will be best illustrated by giving a few of the more striking examples recorded in my notes. No. 6, was placed in the bottle at 10.30 p. m. and began digging the tube in the normal way at 11.15 p. m. It worked rapidly, sometimes taking up and unloading a pellet of earth in 10 seconds. Indeed it worked with as much ease, accuracy, and apparent thoughtfulness, as the mature one which I have described in the Amer. Nat. Sometimes with its palpi it would flirt the pellet across to the opposite side of the bottle. It began making the trap-door at 12.30 a. m. and completed it at 1 a. m; one hour and forty-minutes from the time it began work, and two hours and thirty minutes from the time it was placed in the bottle.* During the operation every movement seemed to facilitate the work. No. 19, was placed in the bottle at 6.30 p. m.: my notes read as follows:—"Began digging tube in normal way at 7.50. Does not seem to be satisfied with work, and begins in another

* One completed the work in hour and 30 minutes; and another 1 hour and 20 m.

place. This is done several times: 9.15 began making trap-door," etc. No. 26 was placed in bottle at 9 p.m. Mar. 19th. At 1 p. m. Mar. 20th it began digging and soon abandoned this place for another. This it repeated as many as a dozen times. sometimes returning to the work and tearing away at the soil as if in a frenzy, and impelled by some irresistable power. Then suddenly leaving the spot it would wander and endeavor to climb the side of the glass; when it would as suddenly be seized with an irresistable inclination to tear away at the earth without any seeming purpose. Occasionally it seemed to work with more deliberation as if it were gradually becoming conscious of a latent instinctive power! At 4 p. m. it continued work in one place until the nest was completed, but the door, which is represented in fig. 13, was barely hung together and was loosely hinged by three strands. A few days later I tore down this nest, when the spider went to work in the normal way and built a perfect nest. Upon this point alone it would be interesting to follow carefully the notes I have taken on all, but I fear it would make the article too long, so I will conclude this subject with reference to a few others. One without digging in the normal way pressed the dirt aside; buried itself, and then spun a bag of silk surrounding it. When removed from this it went to work in the normal way. Several others acted very much like this one, and No. 26.

These variations could not be attributed to a difference in the nature of the soil as in the case of variations noticed among adult spiders, when the soil at times was of a different character. Care was taken that the soil should be of the same compactness and moisture for each. In some cases a hard lump caused the spider to remove to another place, and in one or two instances the spiders waited so long before beginning work that the soil was too dry; pouring in water packed the earth too hard and it was necessary to loosen it before the spider could take up a pellet. With close watching and due allowance for conditions just mentioned there seems to be great variableness in the attitude which different young individuals at first show in the construction of their nest. In some cases the consciousness, if might so be called, of instinctive power flashes upon them when they first are made to shift for themselves; while with others there seems to be a greater or less development or dawning of the same consciousness.

Mr. Moggridge also asks at which end of the tube the spider begins to spin the silken linings? This species, so far as I have observed, (I have watched over thirty individuals,) always begins at the upper end. I had several opportunities of witnessing this among the young ones, and one mature one, when the spinning of the lining was done very beautifully. In fig. 14 a spider is represented in the act of spinning the silken

lining at the upper part of the tube. When the viscid fluid coming from the spinerets cools before it is applied to an object it forms a broad band or ribbon as it might be called; by elevating and depressing the body perpendicularly as shown in fig. 14, and touching the spinerets here and there to the wall of the tube this ribbon of silk is fastened. By moving around the tube at the same time the lining is made complete for the perpendicular distance covered by the spider in its movements. Sometimes instead of elevating and depressing in the manner just described the spider will move around the tube fastening the ribbon in circles.

Figs. 15 and 16 represent a novel way of excavating a hole which I witnessed in the case of a mature spider. With its legs as supporters on each side of the tube it would elevate its abdomen in the air and hook its mandibles in the earth at the bottom of the hole; then revolving through a quadrant about the axis at *a*, fig. 15, it would bring the earth to the surface and push it off with its palpi as shown in fig. 16.

From this study we may conclude the young of trap-door spiders build their nests instinctively; that males as well as females build trap-door nests before the sexual character and habits are well developed, which in the case of the males make a somewhat wandering habit necessary in order to find the females; that young and old vary in making their nests from the normal type, so that the position or relative sloping of the door or tube could not be of any value in the classification; that this species does not use its legs to aid in spinning the lining to its tube, and that they spin the lining at the upper end of the tube first; and lastly that they vary in the degree of skill manifested as artificers and the maturity of instinctive power.*

EXPLANATION OF PLATE.

Fig. 1. *a*, Young trap-door spider, natural size. *b*, section of nest with open door, built in normal way, also natural size. Figs. 2 and 3 curved tube with slanting door. Fig. 4, trench with wall each side seen from one end. Fig. 5, arch connecting walls. Fig. 6, same, closed at one end. Fig. 7, same, with trap-door built at the other end. Fig. 8, another built on same plan, but the first opening not quite closed, a loose flap at *a*. Fig. 9, tube dug between two walls, hinge at *a*, distal part of door at *b*. Fig. 10, curved tube with door hung so as to swing to the right and left. Fig, 11, section of bottle showing work of spider: *a*, wall, *b*, pellets of earth carried up and stuck to the glass, *c*, nest, a tower against the side of the bottle. Fig. 12, nest showing concentric "lines of growth," in the trap-door. Fig. 13, *b*, first hole dug by spider, *c*, second one, *d*, wall between which was removed making of the excavation a trench, subsequently *d*. was restored and nest built in normal way at *b*. Fig. 14, spiders represented in act of spinning silken lining to the upper end of the tube. Figs. 15 and 16, adult spider taking a novel method of excavating a hole.

NOTE.—The doors of all the young trap-door spiders' nests are very thin, from 2 to 3 mm. in thickness. One spider worked so rapidly that it would sometimes pick up and unload a pellet of earth in 8 seconds. As a rule they required a much longer time than this.

* All of the observations made use of in the preparation of this article were made on individuals of the same species. Descriptions of the new species collected, their nests, and food habits, I hope to have published in a subsequent article.

Record of some Contributions to the Literature of North American Beetles published in 1885.

By Samuel Henshaw.

(Continued from p. 71.)

PART II.

CARABIDAE.

Cychrus regularis Lec. 79 p. 2 Id.; C. Rickseckeri Lec. 79 p. 2 Mont.–Calosoma Morrisonii Horn 66 p. 128 Ariz.--Nebria parvula Sahlb. 101 p. 47 Amer. kuste d. Bering-Str. —Pachyteles parca Lec. 79 p. 2 Ariz.—Feronia (Pseudocryobius) splendida Sahlb. 101 p. 49 Amer. kuste d. Bering-Str.; F. epipleuralis Sahlb. 101 p. 49 Amer. kuste d. Bering-Str.; F. plana Sahlb. 101 p. 50 Amer. kuste d. Bering-Str,—Amara angustata Sahlb. 101 p. 51 Amer. kuste d. Bering-Str.—Stolonis Ulkei Horn 66 p. 129 Tex.—Platynus? quadrimaculatus Horn 66 p. 139 Ky.—Galerita decipiens Horn 66 p. 131 Ariz.—Lebia montana Horn 66 p. 131 Mont.; L. lecta Horn 66 p. 131 Fla.; L. scapula Horn 66 p. 132 Ariz.; L. depicta Horn 66 p. 133 Mont.; L. pectita Horn 66 p. 133 pro vittata‡; L. punctifera Lec. 79 p. 2 Ariz. –Chlaenius insperatus Horn 66 p. 134 Ariz.—Brachylobus caurinus Horn 66 p. 134 Cal.,

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Scydmaenus deformatus Horn 66 p. 138 Cal.

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TRICHOPTERYGIDAE.

Actidium robustulum Casey 13 p. 324 Cal.; A. granulosum Casey 13 p. 325 Cal.; A. attenuatum Casey 13 326 Cal.

CORYLOPHIDAE.

Corylophodes (n. g.) Matth. 89 p. 160 pro Arthrolips marginicollis et Corylophus truncatus.

EROTYLIDAE.

Languria divisa Horn 66 p. 139 Col., N. Mex.

COLYDIIDAE.

Synchita dentata Horn 66 p. 139 Fla.—S. obscura Horn 66 p. 140 D. C.; Ditoma quadricollis Horn 66 p 140 N. C.—Coxelus serratus Horn 66 p. 142 Cal.—Lasconotus vegrandis Horn 66 p. 140 Cal.; L. servus Horn 66 p. 141 Cal.

CRYPTOPHAGIDAE.

Cryptophagus beringensis Sahlb. 100 p. 20 Amer. sidan af Berings sund.

HISTERIDAE.

Ulkeus (n. g.) Horn 66 p. 142; U. intricatus Horn 66 p. 143 Kans. Tex.

LATHRIDIDAE.

Cartodera intermedia Belon 4 p. cxcii Amer. sept.

DASCYLLIDAE.

Euscaphurus (n. g.) Casey 13 p. 328; E. saltator Casey 13 p. 329 Cal.

ELATERIDAE.

Horistonotus vulneratus Horn 62 p. 35 Ariz.; H. palliatus Horn 62 p. 35 Ariz.; H. basalis Horn 62 p. 36 Cal.; H. gracilis Horn 62 p. 39 Nev.; H. mitis Horn 62 p. 40 Ut.—Esthesopus praeditus Horn 62 p. 42 Tenn. Tex.; E. parcus 62 p. 42 Ariz.; E. dispersus Horn 62 p. 43 Tex. Ut. Ariz. Cal.; E. pusio Horn 62 p. 43 Fla.—Aptopus peregrinus Horn 62 p. 44 Tex.–Cryptohypnus barbatus Sahlb. 100 p. 30 Amer. sidan af Berings sund.—Anchastus frontalis Horn 62 p. 49 N. Mex.—Elater insignis Lec. 79 p. 11 Tex.; E. fastus Lec. 79 p. 11 Cal.; E. rubriventris Lec. 79 p. 12 N. Mex.; E. melinus Lec. 79 p. 12 Cal.; E. ater Lec. 79 p. 12 Col.; E. longicornis Lec. 79 p. 12 Cal.; E. subtilis Lec. 79 p. 12 L. Sup.; E. lateralis Lec. 79 p. 12 Nev.; E. torquatus Lec. 79 p. 12 Nev.; E. nevadensis Lec. 79 p. 13 Nev.; E. affinis Lec. 79 p. 13 W. T. Cal.–Drasterius asper Lec. 79 p. 5 Tex.; D. cribratus Lec. 79 p. 5 Tex; D. debilis Lec. 79 p. 5 L. Sup.—Megapenthes nigriventris Lec. 79 p. 7 Cal. W. T.; M. lepidus Lec. 79 p. 7 Cal.—Ludius pinguis Horn 62 p. 47 Or.—Agriotes imperfectus Lec. 79 p. 16 Cal.; A. sparsus Lec. 79 p. 17 Or. W. T.; A. hispidus Lec. 79 p. 17 Cal.; A. nevadensis Lec. 79 p. 17 Nev.; A. apicalis Lec. 79 p. 18 Cal.; A. torquatus Lec. 79 p. 18 Cal.; A. montanus Lec. 79 p. 19 Id. Wy.—Leptoschema (n.g.) Horn 62 p. 50 pro Agriotes protractum et al.—Eniconyx (n. g.) Horn 62 p. 51.; E. pullatus Horn 62 p. 52 Ariz.; E. gracilis Horn 62 p. 52 N. Mex.

THROSCIDAE.

Throscus invisus Horn 68 p. 201 N. Y.; T. convergens Horn 68 p. 202. Geo.; T. pugnax Horn 68 p. 202 Fla.; T. mendax Horn 68 p. 203 Cal.; T. sejunctus Horn. 68 p. 204 Cal.; T. debilis Horn 68 p. 205 W. T. Or.

BUPRESTIDAE.

Halecia gentilis Horn 66 p. 144 Tex. Mex.—Chrysobothris ignicollis Horn 66 p. p. 145 Col. Tex.—Schizopus Sallei Horn 66 145 Cal.—Thrincopyge laetifica Horn 66 p. 146 Tex.—Tyndaris cincta Horn 66 p. 147 Tex.

LAMPYRIDAE.

Lycaina discoidalis Horn 66 p. 150 Tex.—Pyropyga simplex Lec. 79 p. 20 Ariz.—Pleotomus nigripennis Lec. 79 p. 20 Ariz.—Lamprohiza Riversi Lec. 79 p. 20 Cal.—Zarhipis Riversi Horn 66 p. 148 Cal.—Spathizus (n. g.) Lec. 79 p. 20.; S. bicolor Lec. 79 p. 21 Ariz.—Chauliognathus ineptus Horn 66 p. 150 Ariz.; C. miselus Horn 66 p. 150 Ariz.—Silis atra Lec. 79 p. 22 W. T.—Telephorus costipennis Lec. 79 p, 21 Fla.—Polemius princeps Lec. 79 p. 21 Ariz.; P. strenuus Lec. 79 p. 21 Ariz.; P. marginicollis Lec. 79 p. 21 N. Mex.—Malthodes bicolor Lec. 79 p. 22 Ariz.

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Cymatodera turbata Horn 66 p. 151 Tex.; C. sirpata Horn 66 p. 152 Tex.; C. fallax Horn 66 p. 153 Tex.—Clerus ocreatus Horn 66 p. 154 Kans.—Hydnocera longa Lec. 79 p. 22 Ariz.

PTINIDAE.

Theca striatopunctata Lec. 79 p. 22 Cal.—Caenocara occidens Casey 13 p. 330 Cal.— Sinoxylon simplex Horn 66 p. 155 Tex.;—S. floridanum Horn 66 p. 155 Fla. —Dinapate (n. g.) Horn 71 p. 2; D. Wrighti Horn 71 p. 2; Cal.

LUCANIDAE.

Platycerus californicus Casey 13 p. 331 Cal.

SCARABAEIDAE.

Glaresis mendica Horn 65 p. 117 Ariz.; G. inducta Horn 65 p. 117 Tex.—Phytalus cephalicus Horn 65 p. 120 Ariz.; P. robustus Horn 65 p. 120 N. Mex. Ariz.; P. pallidus 65 p. 121 Ariz.; P. vexatus Horn 65 p. 121 Tex.; P. debilis Horn 65 p. 122 Ariz.; P. georgianus Horn 65 p. 122 Geo.—Listrochelus flavipennis Horn 65 p. 123 Ariz.; L. gracilis Horn 65 p. 123 Ariz.—Plusiotis Woodii Horn 65 p. 124 Tex.—Orizabus Snowii Horn 65 p. 124 N. Mex.; O. ligyroides Horn 65 p. 125 Ariz.—Cremastochilus spinifer Horn 65 p. 126 Tex.; C. planipes Horn 65 p. 127 Ariz.; C. ineptus Horn 65 p. 127 Ariz.

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CHRYSOMELIDAE.

Lema balteata Lec. 79 p. 24 Ariz.; L. concolor Lec. 79 p. 24 N. Mex.—Coscinoptera dorsalis Lec. 79 p. 25 Ariz.; C. bifaria Lec. 79 p. 25 Ariz.; C. canella Lec. 79 p. 25 S. Cal.—Saximis apicalis Lec. 79 p. 25 Ariz.—Trichotheca vagans Lec. 79 p. 26 Tex.—Chrysochus robustus Horn 66 p. 156 Ariz.—Graphops beryllinus Lec. 79 p. 26 Kans.; G. obscurus Lec. 79 p. 26 Col.; G. varians Lec. 79 p. 26 Ill. Tex. Kans.; G. simplex Lec. 79 p. 27 Tex.—Colaspis Crotchii Lefèvre 80 p.cxcix Car.—Phyllobrotica livida Lec. 79 p. 28 Ariz.—Phyllodecta scutellaris Sahlb. 101 p. 55 Amer. küste d. Berings—St.—Phyllecthrus texanus Lec. 79 p. 28 Tex.—Luperus maculicollis Lec. 79 p. 27 Cal.; L. torquatus Lec. 79 p. 28 Cal.—Androlyperus maculatus Lec. 79 p. 28 Cal.—Agelastica bicolor Lec. 79 p. 28 Ariz.—Galeruca erosa Lec. 79 p. 28 Ut.—Hypolampsis guttatus Lec. 79 p. 29 La.—Caeporis nanula Lec. 79 p. 29 S. C. Tex.—Microrhopala uniformis Smith 115 p. 94 Ariz.—Odontota Horni Smith 115 p. 94 Mass.; O. lateritia Smith 115 p. 95 Ariz.—Charistena bicolor Smith 115 p. 95 N. Mex.

BRUCHIDAE.

Bruchus longiventris Sharp 41 p. 476 Ariz. Mex. N. Sonora.—Zabrotes(n. g.) Horn 66 p. 156; Z. cruciger Horn 66 p. 157 Col.; Z. spectabilis Horn 66 p. 157 Ariz. Nev.; Z. obliteratus Horn 66 p. 158 Ariz.; Z. subnitens Horn 66 p. 158 Geo.; Z. densus Horn 66 p. 158 Cal.; Z. planifrons Horn 66 p. 158. Ariz.

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Conoecus (n. g.) Horn 66 p. 159.; C. ovipennis Horn 66 p 159 Tex.—Zopherus granicollis Horn 66 p. 160 L. Cal.—Rhinandrus sublaevis Horn 66 p. 160 Ariz.—Helops strigicollis Horn 66 p. 161 Cal.

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Dircaea Riversi Lec. 79 p. 29 Cal.

MELOIDAE.

Macrobasis purpurea Horn 64 p. 108 Ariz.; M. lauta Horn 64 p. 108 Ariz.—Epicauta insignis Horn 64 p. 110 Ariz.; E. fallax Horn 64 p. 111 Cal.—Pyrota dubitabilis Horn 64 p. 113 Tex?; P. invita Horn 64 114 Tex.; P. bilineata Horn 64 p. 115 Col. Ariz.—Cantharis molesta Horn 64 p. 111 Cal.

CURCULIONIDAE.

Erodiscus tinamus Lec. 79 p. 30 Fla.—Orchestes betuleti Horn 66 p. 161 D. C.; —Acalles costifer Lec. 79 p. 30 Tex.; A. sulcicollis Lec. 79 p. 30 Tex.-Pseudomus inflatus Lec. 79 p. 31 Fla.-Cryptorhynchus lutosus Lec. 79 p. 31 Fla.; C. brachialis Lec. 79 P. 31 Tex. —Zygops seminiveus Lec. 79 P. 31 Ariz.

ANTHRIBIDAE.

Toxotropis fasciatus Lec. 79 p. 32 Tex.—Choragus nitens Lec. 79 p. 32 Mass.

In the translation of a Cuban work treating also of insects, by an official translator, we find the following interesting and instructive passage; "that the rinocerante and bugs, the cervo volante and also the herculo of America, are more visible by their voracious destructions than poultry yards and sparrows, in the night, at the crepuscle and in the day: also the slow bumble bee and the lightning bug."!

A generic Synopsis of the Hymenopterous family Chalcididae.

By L. O. Howard.

(Continued from page 38.)

Note.—An asterisk should have been prefixed to the following subgenera mentioned in the last installment of this synopsis, as none of them have been found as yet in this country:

Cænocrepis, Hemitrichus, Habritus, Dinarmus, Picroscytus, Bœotomus, Platytermus, Amblymerus, Cecidostiba, Cœnacis, Cricellius, Halcœus, Stinoplus, Habrocytus, Spintherus, Polycelis, Trichomalus, Holizous, Trichoglenus, Meraporus, Catolaceus, Diglochis, Arthrolytus, Dibrachys, Cœlopisthus, Dirhicnus.

Subfamily **EUCHARINAE.**

The genera of this subfamily are in such confusion that it is useless to attempt a synopsis before they have been thoroughly reviewed. I give simply Cameron's synopsis of the four Central American genera.

Scutellum simple at apex. Antennae 13-jointed, simple in both sexes.. .....
*Genus **Orasama** Cameron.

Scutellum ending in two short blunt teeth which are not much longer than broad. Sides of metathorax with leaf-like expansions at apex. Antennæ serrate in female, simple in male..... ....*Genus **Lophyrocera** Cameron.

Scutellum ending in processes which are as long as the abdomen. Antennæ in male flabellate.

Third joint of antennæ as long as all the succeeding joints together..... .....
*Genus **Lirata** Cameron.

Third joint of antennæ not much longer than fourth.....Genus **Kapala** Cameron.

Subfamily **PERILAMPINAE.**

Abdomen not petiolate.

Flagellum of antennæ compacted into a short club....*Genus **Philomides** Haliday.

Flagellum long and only slightly clavate.....Genus **Perilampus** Latreille.

Abdomen petiolate.

Mesonotum thickly and deeply punctate..... *Genus **Lamprostylus** Foerster.

Mesonotum not so punctured.....*Genus **Elatus** Walker.

Subfamily **EURYTOMINAE.**

Marginal vein thick, quadrate; post marginal and stigmal very short; a lunate or transverse submarginal dusky shade. Male antennæ similar to ♀, funicle 4-jointed.....Genus **Decatoma** Spinola.

Marginal vein linear; no submarginal fascia; male antennæ verticillate-pilose.

Cheeks usually acute. Mesonotum umbilicate-punctate.

Scape much longer than first funicle joint.....Genus **Eurytoma** Illiger.

Scape equal in length to first funicle joint.....Genus **Bephrata** Cameron.

Cheeks usually rounded. Mesonotum with more obsolete punctures, not umbilicate-punctate.

Body short; metathorax almost vertical. Marginal vein not longer than stigmal.
Genus **Systole** Walker.

Body long, metathorax sloping gradually. Marginal vein longer than stigmal.
Genus **Isosoma** Walker.

The genus *Philachyra* Haliday I have not mentioned as I think it cannot be separated from *Isosoma*. Of *Aiolomorphus* Walker, I can form no definite opinion.

Subfamily **TRIDYMINAE.**

Antennæ inserted slightly above the clypeus, which is rounded and produced at the apex. Parapsides plainly shown..... ..*Genus **Tridymus** Ratzeburg.

Antennæ inserted at the middle of the front. Clypeus plain, not produced. Antennæ with both ring joints visible.

Parapsides plain. Front impressed with very many dots.

Wings ciliate at apex.....Genus **Semiotellus** Westwood.

Wings not ciliate. Thorax slighty rugose-punctate....*Genus **Systasis** Walker.

Parapsides not plain.....*Genus **Metasteuns** Walker.

Subfamily **SPALANGINAE.**

Body aeneus, wings with a short marginal vein.....*Genus **Isocratus** Foerster.

Body wingless or with a long marginal vein.

Body not at all or very slightly metallic. Frenum not discernible.

Body not metallic; mesonotum opaque, punctate; abdomen conico-subulate. *Genus **Tricoryphus** Foerster.

Mesonotum submetallic, polished.

Body winged; metathorax strongly punctate. *Genus **Cerocephala** Westwood.

Body winged or wingless; metathorax smooth; mandibles of usual size. *Genus **Theocolax** Westwood.

Body winged, mandibles very large, three times the length of the head. *Genus **Paralæsthia** Cameron.

Body metallic; antennæ inserted in the anterior margin of the oblong head. Frenum large, distinct.....Genus **Spalangia** Latr.

Subfamily **PIRENINAE.**

Wings with post marginal and stigmal very short. Ventral valvules not reaching to anus. Antennæ short, clavate; at least the two first funicle joints annuliform.

Antennæ with two ring-joints. Eyes of male strongly converging above. Genus **Macroglenes** Westwood.

Antennæ with at least three ring-joints. Scutellar frenum horizontal. Genus **Pirene** Haliday.

Postmarginal and stigmal veins long. Ventral valvules reaching to anus. Antennæ with one or no ring-joints. Terebra exserted.....*Genus **Henicetrus** Thomson.

Postmarginal and stigmal veins moderately long. Ventral valvules not reaching to anus. Antennæ with no ring-joints. Terebra not exserted. Abdomen with a large tuft of hair each side of petiole.....Genus **Dilophogaster** Howard.*

Subfamily **TETRACAMPINAE.**

Mesopleura not divided. ♂ tarsi 4-jointed. Marginal vein long, narrow..... .. *Genus **Tetracampe** Foerster.

Mesopleura divided. ♂ tarsi 5-jointed, Marginal vein large, black, oblong-oval.... *Genus **Platynochilus** Westwood.

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* This name is proposed as a substitute for *Tomocera*, a genus founded by the writer in 1880—Ann. Rept. Com. Agr. 1880, p. 368, as the name first given conflicts with the genus *Tomocerus* of the order *Collembola*.

Subfamily **ELACHISTINAE.**

Abdomen with a more or less distinct petiole.
Posterior tibiæ with very long spurs. Vertex in the middle, and collar acute.....
Genus **Euplectrus** Westwood.
Posterior tibiæ with one or two short spurs. Pronotum subconical.
Posterior tibiæ 1-spurred. Scutellum with two dorsal lines.
Thorax ornamented with light colors. Scutellar sutures straight.....
Genus **Stenomesius** Westwood.
Thorax not ornamented with lighter colors Body or at least head metallic:...
Genus **Elachistus** Spinola.
Posterior tibiæ 2-spurred. Body not metallic. Scutellum with no dorsal lines...
Genus **Miotropis** Thomson.
Abdomen sub-sessile. Scutellum with two dorsal impressed lines. Posterior tibiæ 1-spurred.
Body winged, metallic, often ornate. .....Genus **Cirrospilus** Westwood.
Body not metallic. Wings short or none.....Genus **Melittobia** Westwood.

NOTE.—Foerster's genera *Aulogymnus, Dichatomus* and *Rhicnopelte* which he places in the Elachistinæ are so insufficiently described that I cannot bring them into this synopsis without seeing specimens. No American species of any of these three genera have been found.

Subfamily **ELASMINAE.**

This subfamily consists of the single genus *Elasmus* which is sufficiently characterized in the subfamily synopsis (p 199 of Vol. 1). Five species have been found in this country.

Subfamily **EULOPHINAE.**

Scutellum with no dorsal lines.
Antennæ inserted in the middle of the face; scape reaches far above the ocelli; ♂ antennæ with 3 branches. Posterior tibiæ 1-spurred .....
*Genus **Hemiptarsenus** Westwood.
Antennæ inserted far below the middle of the face; scape reaches no higher than ocelli. Posterior tibiæ usually 2-spurred.
Parapsidal sutures complete but delicate.
Antennæ of ♂ 3 branched. Abdomen elongate.....
*Genus **Teleogmus** Thomson.
Antennæ of ♂ simple.....*Genus **Olinx** Foerster.
Parapsidal sutures not discernible.
Posterior tibiæ evidently 2-spurred.
Marginal vein at least three times as long as stigmal. ♂ antennæ simple; funicle 5-jointed.....Genus **Sympiesis** Foerster.
Marginal vein not thrice as long as stigmal. ♂ antennæ 3-branched, very rarely simple.
Thorax very stout.....*Genus **Cratotechus** Thomson.
Thorax not robust.
Flagellum of ♀ antennæ compressed, fusiform, ♂ with very short branches. Wings of ♀ dusky...*Genus **Microplectron** Dahlbom.
Flagellum of ♀ antennæ not compressed-fusiform.

Funicle of ♀ antennæ white, ♂ with short branches.....
.*Genus **Microlycus** Thomson.
Funicle of ♀ black, ♂ with long branches.....
Genus **Eulophus** Geoffroy.
Posterior tibiæ 1-spurred.....*Genus **Necremnus** Thomson.
Scutellum with dorsal lines. Funicle and club of ♀ 3–jointed.
Posterior tibiæ 2-spurred.....*Genus **Diglyphus** Thomson.
Posterior tibiæ 1–spurred.....*Genus **Solenotus** Foerster.

Subfamily **ENTEDONINAE.**

Funicle of ♂ antennæ strongly toothed and furnished with whorls of hair.....
Genus **Astichus** Foerster.
Funicle of ♂ antennæ not toothed.
Mesoscutellum with a middle furrow.....*Genus **Holcopelte** Foerster.
Mesoscutellum without such a furrow.
Wings with a seeming marginal cell formed by the hairs.....
*Genus **Secodes** Foerster.
Wings without such a cell.
Postmarginal vein broken just distad of the stigmal.
Submarginal strongly thickened.....*Genus **Pleuropachys** Westwood.
Submarginal not thickened.
Metanotum with side keels.....*Genus **Pleurotropis** Foerster.
Metanotum without keels.
Mesoscutellum scaley.....Genus **Entedon** Dalman.
Mesoscutellum smooth.....Genus **Asecodes** Foerster.
Postmarginal vein not broken after stigmal.
Abdomen elongate, pointed.....*Genus **Omphale** Haliday.
Abdomen not especially elongate.
Antennæ 8-jointed.....Genus **Chrysocharis** Foerster.
Antennæ 9-jointed.....Genus **Derostenus** Westwood.

Subfamily **TETRASTICHINAE.**

Scutellum without furrows.
Wings without a stigmal vein.....*Genus **Anozus** Foerster.
Wings with a stigmal vein.
Whole border of the wings with very long hairs.....Genus **Gyrolasia** Foerster.
Cilia of front wings not long. Thorax strongly punctate.....
*Genus **Euderus** Haliday.
Scutellum with two furrows.
Scape greatly thickened.
Fore wings with long cilia around entire border.....*Genus **Ceranisus** Walker.
Fore wings not ciliate on front border.....*Genus **Baryscapus** Foerster.
Scape not thickened especially.
Antennæ 10–jointed, with no ring joint.....*Genus **Hyperteles** Foerster.
Antennæ 9-jointed with ♂, without ring joints; with ♀ 10-jointed with 2 ring joints and a 3-jointed club.....Genus **Tetrastichus** Haliday.

Subfamily **TRICHOGRAMMINAE.**

Front wings with regular rows of hairs.
The submarginal vein does not reach the costa....Genus **Ophioneurus** Ratzeburg.
Submarginal reaches costa.

Submarginal, marginal and stigmal make a regular arch. Antennæ 8-jointed....
Genus **Trichogramma** Westwood.
These veins make no regular arch. Antennæ less than 8-jointed.
Border of the wings with very long cilia.....*Genus **Chaetosticha** Walker.
Wings from marginal vein to tip bordered with only short cilia.
Antennæ 7-jointed, with one ring-joint and a 4-jointed club.....
*Genus **Lathromeris** Foerster.
Antennæ 6-jointed, with no ring-joint and with a 3-jointed club.....
*Genus **Centrobia** Foerster.
Front wings without regular rows of hair.
Antennæ 7-jointed.....*Genus **Asynacta** Foerster.
Antennæ 6-jointed.
Fore-wings broad, with short cilia around border.....
*Genus **Brachysticha** Foerster.
Fore-wings narrow with long cilia.....*Genus **Oligosita** Haliday.

(To be continued.)

The first meeting of the Ent. Club of the A. A. A. S. will be held at 2 p. m. Aug. 17th in the library room of the Buffalo Soc. of Natural Sciences. No definite programme has yet been made. On some afternoon during the session there will be an excursion of the Club to Mr. Wendling's grounds at Ebenezer, 8 miles from Buffalo, where refreshments will be served; the return to be around the City and through the Buffalo Parks, reaching the City about 8 p. m. There will also be a reception on some evening during the week. Special Badges will be provided for members of the Club, and it is very desirable that all that propose attending, notify the Secretary and send in also the title of any papers they expect to present. It is desired to make this meeting a very successful one and the earnest co-operation of all is desired.

JOHN B. SMITH, Secy.
U. S. N. M. Washington, D. C.

We regret to hear of the death of Capt. D. H. Murdock, 9th U. S. Infantry, lately stationed at Fort Douglass U. T. Capt. Murdock was a good collector and in a good locality, for obtaining rare species. Many good species in our collection came from him. He was drowned while crossing a river with a detachment of troops on a scouting expedition.

* * *

Death from typhoid fever has prematurely removed one of the most active workers in Acarinology, Dr. Gustav Haller who died in Bern, Switzerland, on May 1, 1886, after a short illness. His papers mostly published in the Mittheilungen der Schweizerischen Entomol. Gesellschaft and in various German periodicals have contributed much to our knowledge of the biology, morphology and systematic arrangement of the Acarids and more especially of the families Tyroglyphidæ, Sarcoptidæ and Hydrachnidæ.

Synopses of Cerambycidae.

By Chas. W. Leng, B.S.

(Continued from p. 83.)

BATYLE, *Thom.*

Scutellum small, prothorax sparsely punctured. Two species may be separated:

Larger, black, sparsely pubescent; thorax red, elytra densely punctured. **ignicollis.**

Smaller, red, elytra red with suture more or less black, legs more or less black; elytral punctures coarse, distant..... **suturalis.**

B. ignicollis Say J. A. P. III, 1823, p. 412; Lec. J. A. P. ser. 2, II, p. 18; Thom. Syst. Ceramb. p. 242; *coccineicollis* Hald. Trans. Am. Phil. X, p. 39; Dej. Cat. 3 ed. p. 351; *sanguinicollis* Germ. Ins. Spec. nov. 1824, p. 515.

Length .28–.52 in.=7–13 mm. Hab. S. W. States.

B. suturalis Say J. A. P. III, 1823, p. 411; Lec. J. A. P. ser. 2, II, p. 18; *miniatus* Germ. Ins. Spec. nov. p. 515; *rubens* Dej. Cat. 3 ed. p. 351; *rutilans* Lec. J. A. P. ser. 2, II, 1850 p. 18; *ruber* Lec. Proc. Ac. Phil. 1858, p. 82; *Pearsalli* Bland.

Length .28 in.=7 mm. Hab. U. S. South of N. Y., Mont.

A very variable species. The legs may be red or black or anything between. The suture may not bear a trace of black or it may be more or less black up to the form *Pearsalli* in which the apical third of the Elytra is black. The thorax is occasionally black. (Pl. IV, f. 15.)

OXOPLUS *Lec.*

The species of this and following genera have the scutellum small and acutely triangular. The species of *Oxoplus* are colored red and black and differ from *Tylosis* by having the sides of prothorax obtusely spinose and disk without callosities. The following synopsis by Dr. Geo. H. Horn is extracted from Trans. Am. Ent. Soc. XII, May 1885.

SYNOPSIS OF OXOPLUS.

Thorax black, the tips of tubercles red;

Elytra very densely punctate, color black, the basal margin and the side three-fourths to apex red; body beneath at middle and entire abdomen red; apices of elytra ♂ sinuately truncate, sutural angle rounded..... **marginatus.**

Thorax red, the apical and basal margins somewhat narrowly black.

Abdomen red.

Elytra black, broadly margined with red at base which extends down the side three-fourths to apex; surface densely rather finely punctate; apices sinuously truncate, sutural angle obtuse; body beneath red, sides of meso- and metasternum browner..... **cruentus.**

Elytra in great part red, a broad black band extending from the apex nearly two-thirds to base; surface rather coarsely not densely punctured; apices truncate, the sutural angle slightly prolonged; body beneath black, abdomen red..... **corallinus.**

Abdomen and entire body beneath black.

Elytra colored as in *corallinus* with a very narrow basal black band; surface coarsely punctured at base, more finely and closely toward apex; apices separately rounded, the sutural angle distinct but not prolonged.... **jocosus.**

O. marginatus Lec. Proc. Ac. Phil. 1862, p. 42. Length .86–.95 in.=22–24 mm. Hab. Lower Cal.

O. cruentus Lec. l. c. .75–.85 in.=19–21 mm. Hab. Lower Cal.

O. corallinus Lec. l. c. .70–.80 in.=18–20 mm. Wyom., Utah and N. Mex.

O. jocosus Horn Trans. Am. Ent. Soc. XII, 1885, p. 175. Length .48–.60 in. =12–15 mm. Hab. Col. and Arizona.

(To be continued.)

Notes and News.

In the "Entomologisk Tidskrift" of Stockholm Vol. 6, 1885 is given a Catalogue of the Macroleipdoptera of Norway, Sweden, and Finland. This is of interest to American Lepidopterists for three reasons; 1st the fauna of Arctic Europe is very much the same as that of Arctic America; 2nd the author after an examination of the types of Thunberg, De Geer, and others, replaces nearly 30 names given in Staudinger's Catalogue, by more ancient names principally given by Thunberg, De Geer and Göze, and 3rd, a number of new varieties are named, which may be found in our own Arctic fauna. We notice as well the statement that our *Chrysophanus Phlæas* var. *americana* has been taken by a Swedish collector.

GEO. D. HULST.

* * *

A copy of the Davenport Sunday Democrat (June 27) contains a record of the transfer of the Entomological collection of the late J. Duncan Putnam to the Davenport Academy of Sciences. We are pleased to note the liberal spirit of the relatives who preserved the scientific work of Mr. Putnam by placing his collection where it would be cared for and would instruct and perhaps lead others to follow in his foot-steps. It is too often that a collection accumulated by years of hard labor is allowed to go to ruin by the relatives of the deceased or sold in sections after being robbed of its treasures by some enterprising collector who gets a chance to a get pick at it for a small sum.

* * *

Having in preparation a series of synoptic tables of *Aphodius* with such emendatory notes as are required on my previous work, I will gladly return the names of any *duplicate* sets which may be sent to me.

GEO. H. HORN, M. D.,
874 N. 4th St. Philadelphia.

We learn from "The Entomologist", that our American butterfly *Danais archippus* after taking possession within a few years of the Sandwich Islands and Australia, and while making rapid conquest of the Malayan Archipelago, has as well invaded England, and has been taken so often that he seems likely to conquer and stay. It is rather difficult for the great majority of Lepidopterists to recognise him under the name of *Anosia plexippus*", but that is the name that the British Museum gives to what the rest of the Lepidopterological world calls *Danais archippus*.

We suppose after the English fashion,(if it be not done already), he will soon be dubbed with a "common name" as well, and his identity still further disguised. But none the less, he is an acquisition to the English fauna, new, larger than any of the rest of their butterflies, brilliant in color, showy in appearance, easily caught, easily reared, novel and beautiful in chrysalis and larva, and withal American. G. D. H.

Society News.

Entomological Society of Washington. Meeting July 8, 1886.—The Corresponding Secretary laid before the society a letter from Miss A. Haller announcing the death of Dr. G. Haller, the well-known Acarinologist; also a communication from Dr. Horn announcing the fact that *Harpalus caliginosus* stridulates. The noise is produced by the edges of the last two abdominal segments being rubbed against an alutaceous space on the inner edge of each elytron.

Mr. Schwarz read from a letter of Mr. Hubbard a note on a specimen of *Bradycinetus ferrugineus* which suddenly died while being held in the hand. He also exhibited a male of *Hydrophilus ovatus* remarkable from the form of the maxillary palpi, the two last joints being notably flattened.

Mr. Smith read a note on *Quadrina diazoma* placed by Mr. Grote in the *Hemileucina* but which he finds belongs to the *Cossidae*. He gave a detailed description of the venation and discussed its affinities at some length.

Mr. Schwarz read a short note on a small swarm of Cicadas observed by him at Fortress Monroe, Va., on June 17, 1886. No specimens or pupa shells could be procured and it was impossible, therefore, to decide whether or not these Cicadas belonged to the periodical species.

Mr. Johnson spoke on a Cecidomyidous gall-maker on twigs of *Bumelia lanuginosa* as observed by him in the vicinity of Shreveport, La. The young trees suffer severely from the attacks of this insect.

Mr. Howard spoke on the food-habits of the common House Wren during the breeding season. He observed the rearing of two successive broods of young, the old birds feeding the young exclusively on insects. The principal food consisting of caterpillars, Macrodactylus subspinosus and another small black beetle, apparently a Carabid.

Mr. Schwarz remarked on the habits of two species of Tabanus, *T. mexicanus* and *T. psammophilus*, the former flying only shortly after sunrise and shortly before sunset. The second being a strictly maritime species and probably never attacking warm-blooded animals.

ENTOMOLOGICA AMERICANA

VOL. II. BROOKLYN, SEPTEMBER, 1886. NO. 6.

On two interesting new genera of Leptidae.

By S. W. WILLISTON.

Three summers ago, while collecting in the White Mountains, I found in the shady woods a specimen which I at the time took to be a *Triptotricha*. Upon a more careful examination, however, I was surprised to find only four posterior cells in the wing, and the last posterior vein arising from the discal cell, a variation from the most essential characteristics of the family Leptidæ, a note of which, so remarkable did the anomaly appear to me, I sent to the Stettiner entomologische Zeitung. Afterwards, Baron Osten Sacken, during his visit to the United States the past year, in looking over my collection was struck with the relationship of the specimen with *Stygia elongata* Say, and, although upon examination the species was found to be evidently a different one, there could be no doubt of the congenerousness of the two. *Stygia elongata* has been an enigmatical species of doutful affinities since its description sixty years ago by Say, who placed it under the Bombylidæ. Afterwards, Wiedemann, who presumably examined Say's type, described it as *Anthrax elongata*, and yet again in the same work, as *Lomatia elongata*, with the remark that the "Art gehört ohne Zweifel zu einer ganz andern Gattung", basing his opinion upon the differences in the proboscis, antennæ, and neuration. Baron Osten Sacken in his catalogue retained it among the Bombylidæ as *Lomatia elongata* with the additional observation (note 155, p. 237): "Stygia elongata Say, Lomatia elongata Wied., is not a *Lomatia*, as Wiedemann himself observes, but it is difficult to say what it is. It has the antennæ of a Leptid, but nevertheless only *four* posterior cells. I saw the typical specimen in Vienna and it seemed to agree with

Wiedemann's figure. It is singular that another specimen of this species has never turned up in the United States; it would have allowed a more thorough investigation than the fragile type in Vienna, which one is afraid to handle."

My attention thus called to the subject, I have looked especially for the species, during the few opportunities that I have had for collecting, and a few days ago I was fortunate in finding it near Stamford, Connecticut. During the hour that I was collecting I observed six individuals, but only succeeded in capturing three of them, all males. I found them running about rather nimbly on the upper leaves of underbush in a small patch of partially shaded woods, in company with such species as *Melanostoma platychirus*, *Xanthogramma flavipes*, *Sargus decorus*, *Ptecticus Sackeni*, etc The specimens all agree closely, and there can now be no doubt but that we have, in this case at least, a true Leptid with the normal number of but four posterior cells. As the species must require a new generic name I propose to call it AGNOTOMYIA, in allusion to the long period during which it has been unknown. My specimens differ but little from the descriptions given by Say and Wiedemann, but that the species may be more readily recognized I again describe it as follows:

Agnotemyia elongata.

Stygia elongata Say, Jour. Acad. Phil., III, 41, 1; Compl. Wr., II, 58.

Anthrax elongata Wiedemann, Auss. zweifl. Ins. I, 315.

Lomatia elongata Wiedemann, Auss. zweifl. Ins., 1, 561; tab. II, fig. 6.

Habitat. =Pennsylvania (Say), Connecticut!

♂. Length 7 to 8 mm. Eyes in life green. First two joints of antennæ light yellow, the second large, not elongate, third small, globular, and with the arista or slender style, black. Dorsum of thorax shining black, sparsely white pubescent; the humeri light colored and silvery pollinose, the dorsopleural suture obscurely luteous; pleuræ on lower part elongated, yellowish, covered with silvery pollen; metanotum in part lutescent. Abdomen shining black, the posterior angles of the first three segments rather broadly yellow, continued across on the posterior margin of the segments, rather narrowly in the middle; fourth segment with the hind angles narrowly yellow. Wings distinctly pubescent and with a distinct blackish tinge; toward the base and in marginal and submarginal cells yellowish. Coxæ yellowish white, the legs more yellow; the tip of hind femora, and the hind tibiæ, blackish; tarsi black, the middle metatarsi yellowish, the hind metatarsi, except their tip, and the basal half of the second joint, whitish.

Say describes the wings as hyaline, and does not mention the dark color of the hind legs, and speaks of the abdomen as being depressed. Wiedemann also does not mention the black of the hind legs, but his description otherwise does not leave any doubt but that the species is the same. Neither author gives the sex, but Wiedemann's figure shows that the specimen was a male. The figure represents the species very well,

except that the antennæ are shorter, the second joint more dilated, as Say describes it, and the abdomen less dilated distally. The abdomen in my specimens in drying became compressed, and it is possible that the same condition existed in the type, and was too widely restored in drawing.

The genus approches *Triptotricha*, rather closely, but the size, slenderness, and the presence of but one spur on the front tibiæ are all different. The presence of but four posterior cells is undoubtedly a normal character, and I doubt that it is at all variable; yet this hitherto important family character will not serve for aught else than for a distinguishment in the present case; the genus finds its proper location with *Triptotricha* in the sub-family Psammorycterinæ*. *Triptotricha*, as Loew years ago pointed out, frequently varies in having the third posterior vein abbreviated, and in the examination of a considerable series of *T. fasciventris* Loew, I have observed the last posterior vein rarely arising from near the base of the discal cell. It is thus possible, that, as an anomaly, a neuration similar to, if not identical with, that of the present species may exist in species of *Triptotricha*. For this reason I am unwilling to describe the first-mentioned species from the White Mountains until additional specimens shall have assured me that its neuration is a normal feature. In both of these species, however, the single spur on the front tibia will serve, I believe as a generic distinction should such a case possibly occur in *Triptotricha* where the third posterior vein is wholly obliterated and the last vein does not spring from the second basal cell. In the three species of *Triptotricha* known to me, all the tibiæ have two spurs. The formulæ for the tibial spurs in this family, so far I have observed them, may be expressed as follows:

Agnotomyia, 1, 2, 2.	*Atherix*, 0, 2, 2.
Triptotricha, 2, 2, 2.	*Symphoromyia*, 0, 2, 1.
Leptis, 0, 2, 2.	*Arthroceras*, 0, 2, 1.
Chrysopila, 0, 2, 1.	

Arthroceras *n. g.*

In size, shape and general appearance much resembling certain species of *Chrysopila*, e. g. C. *quadrata*. Head in front view much like that of this species, but the front somewhat narrower and the lower part of the face does not form a hemispherical convexity as in the species of *Chrysopila*, but is in the female nearly straight or gently convex in profile, transversly convex and separated from the sides by two convergent deep grooves more like it is in species of *Symphoromyia*. In the male the grooves are deeper, broader, and more broadly V-shaped

*Better *Vermilioninæ*, as, according to the usage of good Zoologists, the genus *Psammorycter* Blanch. should not replace *Vermilio* Macq. because the latter was raised from specific to generic use. There is quite as much propriety in changing *Musca vermilio* Deg. into *Vermilio Degeeri* as many of the numerous arbitrary changes that have been made in the generic names of diptera. Nor indeed would there be more impropriety in calling the species *Vermilio vermilio* Deg. than to call a man Mr. Thomas Thomas.

the middle portion smaller, more receding, and concave from the apex of the V above. The eyes in the male are broadly contiguous; the palpi are porrect, and somewhat spatulate, at least in the female. Antennæ as in *Chrysopila*, except that the third joint is not at all dilated, and the arista is replaced, by a thickened, elongate, distinctly jointed style, a little broader toward the base, where it tapers from the joint. I count seven joints in the style, the last of which is elongated. Legs as in *Chrysopila*; the hind tibiæ with one, the middle tibiæ with two, rather weak spurs, the front tibiæ with none. Wings large, the second vein sinuous as in species of *Leptis*, the anterior branch of the third vein not sinuous, and without stump; the second posterior cell narrow or petiolate at base, the anal cell open.

This genus is the one referred to in my Classification (*Entom. Americana*, I, p. 115) in the tabular synopsis as "Nov. Gen." O. S. and contains, beside the following new species, *Arthropeas leptis* O. S. The generic difference from *Arthropeas* in the spur of the front tibiæ was pointed out by Baron Osten Sacken four years ago, and, as he has not yet proposed a name for the genus, I venture to do so in order to describe the following interesting species. No one who will compare the present with other species of Leptidæ will for a moment doubt the family relationship. It must unquestionably be placed under the Leptidæ, and not with the Cœnomyidæ or Xylophagidæ. The addition, however, of the two genera herein described, with *Glutops* Burgess, furnishes most important exceptions to the distinctive characters of the family, and will make the limits very hard to define.

Arthroceras pollinosum, n. sp.

Habitat.—Washington, Colorado!

♀. Length, 5.5 to 7 mm. Face and front thickly light ochraceous pollinose. Antennæ black, the third joint at base, and the tip of second, reddish or yellowish. Palpi reddish yellow, the tip black. Thorax in ground color black, but the dorsum and the scutellum concealed beneath dense, nearly uniform ochraceous yellow pollen, and the pleuræ beneath gray pollen, ochraceous above. Abdomen wholly and evenly covered beneath with light grayish yellowish pollen, in the ground color black, at the hind margins of the segments, more broadly behind, apparently yellowish or reddish. Legs yellow or lutescent yellow, the last four joints on all the tarsi brownish. Wings distinctly tinged with brownish yellow, the costal cell and outer part of marginal cell of a more saturate color; veins luteous yellowish, more fuscous toward the outer part of the wing.

♂. Face more grayish pollinose. Palpi black, and bushy pilose. Abdomen in ground color wholly black, the hypopygium at tip, only yellowish. Femora, except the tip, black, the tarsi, except the base, darker; the light colored pile of the legs longer and more abundant.

Descriptions of some New Trap-Door Spiders; Their Notes and Food habits.

By Geo. F. Atkinson.

A few months after sending the manuscript of the article, "A new trap-door[1] spider", to the publishers, I found a specimen which differed so markedly in color from the one, the subject of that article, and agreed so closely with the one described by Hentz as *Mygale carolinensis*,[2] now *Pachylomerus carlinensis*,[3] Hentz, that before having an opportunity to study them carefully I concluded the only difference was in color. Just after the article, "A family of young trap-door spiders",[4] was in type I discovered that the two forms were different species; that the one called in the Amer. Nat. "A new trap-door spider", and the young spiders whose work is described in the Ento. Am. were both new species: the former I have called *Pachylomerus caribivorus*, and the latter *Pachylomerus 4-spinosus*.

The nests of *P. caribivorus*, and *P. 4-spinosus*, have already been described in the arcticles referred to. One thing however, in regard to *P. caribivorus* is worth adding. The last trap-door made by this species as described in the Am. Nat. p. 590, was in sharp contrast, being made almost entirely of clay, with the surrounding moss. In a few days the spider made an examination of its work and found it had made a mistake in not placing moss in the door. It remedied this as well as possible by cementing moss to the edge of the door and pressing the ends down so that about half of the door was covered with moss!

Nest of Pachylomerus turris. March, 5, '86, on turning over an old log, a sudden movement of an object downward attracted my attention, I looked and discovered a silken tube, with particles of earth and leaf mould attached extending above ground. On one side the silk was so extremely thin as to afford a "window" to the spider's house! It was through this that I had discovered the movement which attracted my attention. Nearly the entire remaining portion of the tube was covered with earth and leaf-mould, and here the silk was thinner than in other portions, yet intact. It seems almost incredible, yet from the wonderful intelligence manifested by these spiders, I was led to think this "window" had been purposely made: that the spider would sit by it and watch for beetles crawling about under the log, and seeing one would rush out

[1] American Naturalist, Vol. XX, p. 583, July 1886.

[2] The Spiders of the United States, by Nicholas Marcellus Hentz, M. D., Boston Journal, IV, p. 56. pl. VII, fig. 3.

[3] Beiträge zur Kenntniss der Territelariae, Ausserer, p. 147.

[4] Entomologica Americana, August 1886.

through the door, seize its prey and return to its tower! It seems more reasonable when we consider that *Nidivalvata marxii* (see food habits of this species,) will nightly open its doors, remain out of sight, watch for passing insects, and rush out and seize them. The tube was about 8cm. in length, and there was only a very shallow excavation in the clay soil. The door is of the "wafer type", and was fastened down by silk, probably in the fall when the spider prepared for hibernating.[1]

In the evening I placed the spider in a bottle of earth. During the night it burrowed into the soil and made a rude door, which appeared more like a flap hung from one side of the mouth of the tube. On the evening of Mar. 7, I removed a portion of the soil and placed in a portion of clay intermixed with loam, scattering over this a few bits of moss. I did not see the spider make the burrow, but next day saw it make two-thirds of a door, when I put an end to operations on that nest. The door was made practically in the same manner as that by *P. caribivorus*, but was a wafer door.

From the appearance of the tube and the soil about it in both of the nests made in captivity, I felt sure this spider did not dig the hole in the *normal way*. Accordingly, Mar. 8, I prepared a jar of wet clay. Up to 11, p. m. the spider had not begun work, but in the morning the work had not progressed too far for me to observe it. The spider begins the burrow in a manner similar to that practiced by *Nidivalvata Marxii* by pressing the earth aside from a central point with its anterior legs, using also its mandibles, but it is much slower in its movements than

[1] Mr. Moggridge says in Harvest Ants and Trap-door Spiders, Supplement, p. 236. "I have on very few occasions, found the doors of a wafer or cork nest spun up during the winter at Mentone, and on digging have discovered the spider alive, though partially torpid, inside; but this I think is quite an exceptional event. I should like to know, however, whether this becomes the rule in the case of the nests of those trap-door spiders which inhabit climates less favored than that of Mentone." He also speaks of a Lycosa that is said to close her nest in Canes in winter. Latreille, in Mem. Soc. Hist. Nat. Paris, (an VII, de la Repubique) p. 124, Says, "L'araignée tarentule ferme aussi son habitation, mais cet opercule n'est pas mobile, et n'est construit que pour l'hiver." I have on several occasions found that *P. caribivorous*, after eating one or two beetles, fastens down the lid with silk. *Nidivalvata marxii*, I have found fastens the doors at times (See Amer. Nat. Vol. XX, p. 592.)

O, P. Cambridge, in Annals of Nat. Hist. 1878, 5th series, Vol. I, p. 107, says that in all cases that came under his notice the upper extremity of the nest of *Atypus piceus* was without any perceptible orifice. He finally came to the conclusion that the spider gnawed its way out and then closed it with fresh threads again. These examples seem to indicate that spiders will very frequently at least fasten the doors to their nests during a period of rest, when inactive and more liable to be injured, when having had sufficient food, and perhaps sometimes at regular periods when not engaged in watching for food. It seems reasonable to suppose that in climates where the spiders are in a torpid state they would fasten their doors during this period.

N. marxii. *Pachylomerus turris* is the spider represented in fig 15 & 16 of the Ento. Am. for Aug. excavating in a "novel way". In making the trap door, sometimes when in this position it would cement the particle to the door by pressing on top of the door with its posterior legs, against the ventral surface of the cephalothorax. When the hole was about 3cm. deep it would occasionally take earth out in the normal way.

It will be seen that the habit of this spider is not wholly nocturnal in building its nest. During the month of July while I was at Ithaca, N. Y. I had a specimen of *P. caribivorus* make a nest for Prof. Comstock. This was made entirely during the day. By reference to the young trap-door spiders[1] it will be seen that *P. 4-spinosus* works just about as well in day as at night.

Nest of Nidivalvata marxii. The first one of this species which I found was taken Jan. 2, 1886, and which I have formerly mentioned as making in captivity a "folding door."[2] In tearing up some moss I observed a tube in the bottom of which was the spider. Whatever there was at the upper end of the tube was destroyed in removing the moss, so that I have not had an opportunity to observe the door to the nest where the spider makes its nest in a patch of moss. I have found several nests of this species by gathering moss. In all there were what appeared to be branches just above the surface of the ground at the base of the moss. These I regard as avenues in which the spider would search, or lie in wait, for ants.

In captivity this spider made a very interesting nest with folding doors (See figs. 17 and 18 Plate V) and I believe it is with some such arrangement that it closes its tube in a state of nature, for the spider makes use of it in catching its prey, as will be described in the food-habits of this species. This kind of a door, I believe, has never before been seen or described, and adds one to the different types of nests which Mr. Moggridge has described and named.[3] The right name for this type should be "double door", but as Mr. Moggridge has used that name for a nest which has two doors, one at the upper end of the tube and another some distance below at the opening of a branch in the main tube, it cannot be applied to this one. So I have called this new type the *folding door nest,* from the manner in which the door opens and shuts.

This species begins the excavation of its tube by parting the earth from a central point with its anterior legs and palpi turning around at the same time so as to push the earth on all sides. It works with ex-

[1] Entomologica Americana, August 1886.

[2] American Naturalist, Vol. XX, p. 592.

[3] Harvesting Ants and Trap door Spiders; and Supplement.

ceeding rapidity, and in this respect is in strong contrast with the members of the genus *Pachylomerus*, though the young ones of that genus work more rapidly than the older ones. When beginning the nest in a patch of moss the spider will dive down into the moss and begin turning rapidly in all directions, at the same time spinning threads to fasten together the pieces of moss around and over it. I have watched four different ones make the nest, two beginning in moss which I had placed over the earth, and two beginning in soil. Two of these I had make a nest several times, and thus far every one has first entirely closed the entrance to the tube by building a sort of dome above it. Later, in one case a week, cutting through this and making the folding door.[1] Usually while at work near the surface of the earth it will burrow out in different directions and elevate the surface of the earth. This I think is partly for the purpose of providing a place to put the earth which it excavates from the lower portion of the tube. as I have seen these filled up; and in one specimen, after the tube was about 2 cm. deep I observed the same habit of digging and cementing to the edge of the tube, as observed in the case of *Pachylomerus caribivorus* and *4-spinosus*. This individual made the dome by carrying up three sides regularly until it had completely covered the entrance. Usually in making the dome earth is placed on and about the edge of the tube, occasionally applying viscid liquid and spinning threads over it. Then the spider would, with its anterior legs and palpi pull the edge over the tube. This operation would be repeated until the dome was complete.[2] When moss is convenient the door is made almost entirely of moss and silk; each door is a surface of a half circle, is hung by a semicircular hinge, and the two meet, when

[1] NOTE.—In the Encyclopedia Brittannica, 9th edition, 1875, Vol. II, p. 291. O. P. Cambridge says: "The present writer was once told by a gentleman who had formerly resided in the West Indies that trap-door spiders invariably made the tube and lid of one continuous, solid, homogeneous piece, and then cut out the lid with the falcers. This account, especially as coming from a non Naturalist seems improbable, a spiders falcers being in no way fitted apparently for such an operation." Where the silk linining was thin, it would be a very easy matter for a spider to cut through, and then repair the roughness by cementing on particles. It is probably an exaggeration to say that they "invariably" construct them in that manner, but I should not be surprised if some species made the trap.door in the manner described by this non "naturalist."

[2] I have never seen this spider press the lid on the ends of its mandibles as does *P. caribivorus*. I think this shows the adaptation of the special armature of the mandbile of *P. caribvorus*, and related forms, for fastening the earth to the lid. *P. caribivorus* usually makes no thread in applying the viscid liquid to the door while adding particles, but puts it on as a *cement*. The large point of the mandibles, which is covered with short strong spines serves admirably to punch the earth irregularly into the portion of the door already made, and causing it to adhere firmly.

closed, in a straight line over the middle of the hole, as shown in fig. 18, Plate V. Every night (I observed one in my room for three months) the spider would throw open its doors as shown in fig 17, Plate V and in the morning close them. If I opened the door during the daytime the spider would invariably come up and close it, but never immediately, and never did it offer to catch the door and resist its opening. When members of this genus build their nest under stones, as they sometimes do, if the stone is elevated from the earth in one place the spider builds the tube above ground to the under surface of the stone, and here makes some sort of door, I have never been able to see just what, but probably very much like the ones made in captivity. A longitudinal section of one of these nests which I found under a stone is shown in fig. 11, Plate, IV, the surface of the ground at *a* and the mouth of the tube at *b*. On turning over the stone I saw what I thought was the cocoon of a moth, from which the insect had escaped at the upper end. I picked it up, and discovered the tube which I found about 12 inches deep, with the spider[1] at the bottom. This nest, perhaps inappropriately, I have called the *hall door nest*, because of the enlargement just within the entrance. This I consider would be of advantage to the spider in managing the door while catching an ant. The portion above ground was made of loam and leaf mould cemented with viscid liquid and lined on the inside with silk. So far as I have oberved, the members of this genus line only that portion of the nest with silk which is liable to cave in near the upper portion of the tube.[2]

Nest of Myrmekiaphila foliata.

The nest of this species is not constant in type, and shows wider variation in different individuals than any of those thus far described; but when taken in connection with the food habit of the species there does not seem to be a very great departure from a common type.

The first individual was collected March 13, '86 by myself. In collecting specimens of ants and their root feeding "cows" (Aphides) which they were protecting through the winter, I found a trap-door on turning over a stone. The tube I traced down about 14 inches, when I came upon and struck the spider off at one side. In doing so I broke off a leg and palpus so that the spider died the next day. At the time I thought the spider must have underground galleries in which it hunted for ants similar to the galleries in the moss of the nest of *Nidivalvata marxii*. But since finding the nests of other individuals I think there

[1] *Nidivalvata angustata.*

[2] I have observed the same thing with Myrmekiaphila foliata.

must have been a branch from the main tube with a trap door, and the soil being so full of rocks I failed to find it.

The second individual I collected on the morning of Apr. 6, '86, while digging into a side hill with a southern exposure for white ants (*Termes flavipes*,). Discovering a tube I traced it until I found at one side a trap door opening into a short branch. In this I found a fine specimen of trap-door spider. The nest I concluded belonged to the type called by Mr Moggridge, "Double door branched nest", but differs from that in having a cork door instead of a wafer door. I did not see the door at the end of the main tube, if there was one, as the soil was very loose and rocky, and every trace would have been destroyed before finding the main tube.

The third individual was collected in the afternoon of the same day, by one of the students, D. E. Woodley. The tube ran under a stone, a trap-door was at the upper end, but the branch and second door was not seen: Mr. Woodley said, however, that it might have escaped his notice as the tube was not traced out very clearly.

The fourth individual I collected Apr. 6. On turning over a stone I saw what is represented in fig. 16, Plate V except that the trap door was closed, and the spider was in the tube a short distance below it. The space above the trap door is a portion of an ants nest, *b* is the entrance from the surface of the earth; *a*, *a*, is a broad hall-way leading off into galleries on the side. The spider had come down at *b*, undoubtedly during the night while the ants were quiet, unconscious of the purpose of their terrible enemy, dug the hole in the center of this hall way, and covered it with a trap-door before the ants were stirring at the break of day. The soil was in a good condition for tracing out the tube, which I did very carefully and found neither branch nor second door, so that this nest was of the type *single cork door, unbranched nest.*

The fifth I collected on the same day and not more than 10 feet distant. Turning over a stone I saw a tube which ran down one of the perpendicular sides of the hole, in which the rock fitted, then along the bottom to near the center of where the stone lay. Here it disappeared taking a perpendicular direction again. I ran a straw down this tube and felt the movements of the spider. The spider would not seize the straw, as they sometimes will, and soon I could no longer feel the movements. I then dug carefully around the tube, and at the depth of about 10 inches struck the spider, splitting open its caput. This happened because the spider was in the branch: when I first ran the straw into the tube he was in the main tube, and probably bein frightened ran into the branch and caught hold of the door. This confirms what Mr. Mogg-

ridge believes to be the case with spiders making a double door branched nest, that when an enemy succeeds in getting entrance to the main tube the spider will run into the branch.[1] This nest is represented in fig. 15, Plate V. Though the tube is represented nearly natural size the length is much fore-shortened, The space represented by the dotted lines *a* and *b* was 10 inches for each. The spider was found at *b*; the cork door can be seen at *c*.

Another specimen was found, about which, unfortunately, I have no record nor recollection, except that it was collected sometime during the spring. This, though I have not given it a careful examination I believe to belong to the same species. I left it in the possession of Dr. Geo. Marx, at Washington.

The specimen collected Apr. 6, I placed in a jar of earth to see what kind of a nest it made in captivity. For several days it showed no signs of working. Finally I found it buried in the earth much as *Nidivalvata marxii* is, when having just completed the dome over the tube, and from the appearance of things I think the burrow was started, and the dome made in the same way as in the case of that species. The next day in place of the dome, in which there was no moss, was a perfect cork door with an abundance of moss in it. The spider had evidently cleared away the dome, which was made of earth and silk, and made the door of new material.

When I lifted up this door the spider would catch hold of it. In a few days I found this door fastened down and that end of the tube filled with earth for a distance of 5 cm. The tube extended in a circuitous direction for 10 cm or more where it came to the surface and was closed by another nicely fitting trap-door. I think the spider was alarmed at the discovery of her nest, and attempted by this strategy to deceive her enemy. If the jar of earth had been more capacious, and a longer time given the spider she might have made a branch and second door.

Food habits. I have not yet had an opportunity of making very extensive observations on the food habits of these species, and cannot say that each one is confined to the insect for which I am certain it has a special fondness as an article of diet. Of the species of *Pachylomerus* my observations have been confined to *P. caribivorus*. I have already stated the fondness which this species has for carabid beetles,[2] and though killing several ants and flies did not use them for food, During July, while at Ithaca N. Y. I fed several carabid beetles to a *P. caribivorus* which I

[1] Harvesting Ants and Trap-Door Spiders.

[2] Am. Nat. July 1886. Vol. 20, p. 592.

had alive. June 20, I placed a *Pterostichus lucublandus*[1], Say, in the bottle containing the nest of the spider. During the night the spider came out of the nest, caught the beetle, ate it and ejected the hard parts from the nest. July 1st, it disposed of a *Pterostichus Sayi*, Brulle. June 29 it ate a beetle of the genus *Chlænius*. At another time it ate three good sized beetles of the genus Chlænius in one night.

The observation which I made on *Nidivalvata marxii* in captivity are very interesting. I noticed that at night the spider would throw its doors wide open[2] as shown in fig. 17, Plate V. One evening I placed several in the jar containing the nest. When an ant approached so near the door as to send a communication to the spider of its presence, the spider sprang to the entrance, caught a door with the anterior legs on either side, and pulled them nearly together, so that there was just space enough left for it to see the ant when it crossed the opening. When this happened, the spider threw the doors wide open, caught the ant, and in the twinkling of an eye had dropped back to the bottom of the tube with its game. This I saw repeated several times during the months of January and February. At one time I placed a large cricket in the jar. The spider made several attempts to capture it but was not strong enough. It would probably eat crickets when fortunate enough to catch one. I think also that it would eat small carabid beetles, for I found several in the moss where I collected the spider. I have found the remains of ants in the nests.

I have made no observations on *Myrmekiaphila foliata* in captivity, but from the location of their nests it is quite evident that the members of this species are extremely fond of ants, and seek to build their nests

[1] I am indebted to Prof. J. A. Comstock for the identification of the species of beetles.

[2] The position of *Nidivalvata* in the subfamily *Eriodontinæ* shows its near relation to the *Atypinæ*. I have often been struck with its likeness to the *Atypinæ*, especially in the kind of a nest it makes, and though I have never seen an *Atypus*, nor one of its nests, I have often concluded that from the form of its nest it must be somewhat similar to *Nidivalvata* in architectural habit, and that the presence of a door, or covering for the entrance to its nest instead of being wanting, has been overlooked; that in the cases where the nest was open, accident had removed the door. What O. P. Cambridge says in Annals of Nat. Hist. 4th series, 1875, Vol. XVI, p. 240–241, seems to me to indicate that *Atypus* is very similar in habit to this genus. Not only in the form of the nest, but in its food habit. He says that on one occasion a nest which apparently had no orifice was buried in a box of earth; subsequently the tube was observed with a wide open mouth, and again was closed the following morning. The spider probably opens the doors at night to watch for food, and closes them in the morning as does *N. marxii*.

either directly in an ants nest or in close proximity to it. I think in some cases it is intended that the main tube shall be used as a passage for ants, so that by coming out of the branch the spider can capture its food, for it is certain in these which I have observed that the external door is either wanting or old and in a neglected condition, while the door at the branch is kept well repaired. If I am correct in this conclusion it would account for the apparent variation noticed in the kind of nest built by this species. In the nest represented in fig. 16, Plate V, the entrance *b*, and the landing *a*, *a*, of the ants nest answers for the main tube of the spider, and only the one tube and trap-door is required for the use of the spider.[1]

[1] NOTE.—There evidently is quite a variation, even with the same species, in the kind of a nest which trap-door spiders make, As these prove to be very intelligent creatures, I believe they vary in the construction of the nest as the conditions of their environment varies, and that they adopt that plan which provides for them the safest abode, and at the same time will serve them the best as a trap. At the same time we must not lose sight of a common type, which, with some useful variations, each species follows; though species of different genera may make the same kind of a nest, and be identical in food habit, species of the same genus may vary with regard to the common type; so that the use of nests, and food habits, becomes of less value than has been heretofore supposed by some for purposes of classification.

Mr. Moggridge says, "H. A. and T. D. Spiders" Supplement, pp. 236, and 237; the range and distribution of a species largely depend upon the nature of its food, and this will also be an indication of the rivals etc. —"and in many cases even the *structure* and *position* of its dwelling place will be governed by this same all—important question of food supply."

Rev. O. P. Cambridge, at that time came to this conclusion, "and in the present case it is very important, as well as interesting, to conclude with some certainty that differences of type in the tubular nests of the spiders Mr. Moggridge has observed so closely and accurately, are joined to well marked specific differences etc. "Harvesting Ants and Trap-Door Spiders, Supplement. p. 301". Later, Cambridge doubts such close union of specific character and architectural habit, for he finds nests of *Atypus piceus* varying greatly in construction. (Annals of Nat. Hist. 1878, 5th series, Vol. I, p. 107.) From nests made in captivity, I know that *Pachylomerus turris* and *Nidivalvata angustata* make different nests according as the environments change.

(To be continued.)

A monograph of the species of the subfamilies Eucneminæ, Cerophytinæ and Perothopinae inhabiting the United States. By George H. Horn, M.D. **Tr. Am. Ent. Soc. xiii p. 58. February 1886.**

The species in these groups are mostly rare, and are very generally wrongly named in collections. The present paper is therefore very timely since it not only calls attention to the insects, but enables students to straighten out their material. It would be interesting to discover something of the habits of these species. Most of them are accidental finds and no one knows exactly where to look for them with any certainty of success.

Synopses of Cerambycidae.

By Chas. W. Leng, B.S.

(Continued from p. 103.)

SCHIZAX *Lec,*

A single species is contained in this genus;

S. senex Lec. S. M. C. No. 264, 1873, p. 196.

Length .52–.68 in.=13–17 mm. Hab. Arizona.

Opaque black, clothed with cinereous pubescence, the sutural lateral and apical margin of elytra fulvo pubescent. Prothorax strongly, elytra slightly punctured.

TYLOSIS *Lec.*

Contains two species: black, beneath with sparse white pubescence, thorax and elytra red with or without black spots, which are very variable. They are separated as follows:

Elytra red with black spots; thorax red with several black spots, (Plate I, fig. 18,).... ..... **maculata.**

Elytra red without spots, thorax red with black dot at middle of each side..... **oculata.**

T. maculata Lec. J. A. P. ser. 2. II, p. 9; Col. of Kansas, 1859, p. 20, t. 2, fig. 15; *punctlcollis* Klug. Dej. Cat. 3 ed. p. 348; *sellata* Lec. l. c. IV, 1858, p. 25. Length .36–.68 in.=9–17 mm. Hab. Tex., Ariz. and New Mexico.

T. oculata Lec. l. c. II, p. 9. Length .45 in.=11 mm. Hab. Mexican Bdy.

CROSSIDIUS, *Lec.*

A. Prothorax subquadrate.

Black, clothed with long gray hair; elytra very densely punctured, punctures very coarse at the base, becoming finer behind; front tibiæ with a dense brush of hair on the inner side. ..... **ater.**

B. Prothorax rounded and subtuberculate on the sides.

Elytra very coarsely punctured towards the base, punctures smaller behind.

Head, antennæ and legs black; under surface and pronotum black, or rufous; elytra rufo-testaceous with basal margin and sutural blotch black, the latter usually narrow or wanting in ♂, broader in ♀..... **punctatus.**

Testaceous, antennæ fuscous, legs ferruginous; elytra with two costae more distinct than in the other species..... **testaceus.**

Testaceous, antennæ fuscous, legs ferruginous; elytra without costæ, suture black, broader in ♀..... **intermedius.**

Smaller, legs, antennæ and head black; under surface yellow, trunk frequently, abdomen rarely blackish; pronotum more or less black; elytra yellow with humeral spot and sutural blotch more or less dilated, black. . . **pulchellus.**

Elytra less coarsely punctured, punctures smaller towards the tip.

Black, abdomen usually ferruginous; elytra rufo-testaceous, with basal margin and usually the whole of the suture black, the blotch never very much dilated; front tibiæ with a dense brush of hair on inner side..... **hirtipes.**

C. Prothorax rounded on the sides, not angulated.

Elytra densely and finely punctured.

Piceous without lustre, very densely clothed with dirty yellow hair; sides of elytra broadly testaceous, blending imperceptibly into dark color; beneath testaceous and very hairy; antennæ and legs black..... **Allgewahri.**

Elytra more coarsely punctured.

Dull testaceous, densely pubescent; punctures of elytra dense, finer behind; thorax with two dorsal callosities; markings of elytra varying from a short humeral vitta to a complete piceous vitta and dilated sutural stripe..... **humeralis.**

Bright red, antennæ, postpectus and head black; elytra coarsely punctured, punctures denser and somewhat smaller behind, basal band and sutural blotch black, the latter very broad in both sexes..... ..... **discoideus.**

C. ater Lec. Proc. Ac. Phil. 1861, p. 356. Length .40–.52 in.=10–13 mm. Hab. Utah, Cal.

C. punctatus Lec. S. M. C. No. 264, 1873, p. 197. Length .52–.68 in.=13–17 mm. Hab. Or. Cal.

C. testaceus Lec. J A. Phil. ser. 2, II, 1852, p. 102. Length .48 in.=12mm Hab. Cal. Col.

C. intermedius Ulke Wheel. Rept. Geogr Expl. V, p. 813, t. XII, f. 1. Length .60 in.=15 mm. Hab. Arizona, New Mexico.

C. pulchellus Lec. Proc. Ac. Phil. 1861, p. 356. Length .40–.52 in.=10–13 mm. Hab. Cal., Col., New Mexico, Utah.

C. hirtipes Lec. Proc. Ac. Phil 1854, p. 18; Ent. Rept. 1857, p. 61. Length .40–.48 in.=10–12 mm. Hab. Cal., Oregon, W. T., Utah.

C. Allgewahri Lec. Bull. U. S. Geol. Survey, IV, 2, p. 461. North Amer. Ent. I, p. 1, pl. I, fig. 1. Length .40–.53 in.=10 13.3 mm. Hab. Idaho.

C. humeralis Lec. J. A. Phil. IV, 1, 1858, p. 25. Length .40–.48 in.=10–12 mm. Hab. New Mexico, Texas.

C. discoideus Say, J. A. P. III, p. 411; *pulchrior* Bland. Proc. Ent. Soc. Phil. I, p. 472. Length .36–.48 in.=9–12 mm. Hab. Idaho, Col., Ariz., Mont., Neb., New Mexico.

All the species of *Crossidius* seem subject to variation in color and marking, a careful discussion of which beyond what is included in our synopsis will be found in S. M. C. No. 264, p. 197 and in Dr. Horn's recent paper on the genus in Trans. Am. Ent. Soc. XII, p. 177.

SPHAENOTHECUS, *Dup.*

Contains one species.

S. suturalis Lec. J. A. P. IV, 1, 1858, p. 25. Length .40–48 in.=10–12 mm. Hab. Texas and New Mexico, Ariz., Cal.

Easily distinguished by the white pubescence, which, very sparsely scattered over, the elytra is arranged in a dense and very conspicuous narrow line at the suture. The prothorax is deeply, but sparsely punctured and rounded on the sides, and the scutellum moderate and also clothed with white pubescence. Color reddish brown or black. Antennæ ♀ longer, ♂ nearly twice as long as body.

PERARTHRUS, *Lec.*

Contains one species.

P. **vittatus** J. A. P. ser. 2, II, p. 102. Length .55 in.=14 mm. Hab. Cal.

"Black, deeply punctured, clothed with erect gray hairs; thorax strongly transverse, narrowed at apex, convex, bi-sinuate at base, rounded at the sides. with a small shining callosity at the middle and a basal spot each side golden pubescent; elytra black with two smooth elevated yellow lines; legs red, tarsi black. The scutellum is covered with dense yellow hair; the exterior vitta of elytra abbreviated at each end and the anterior portion of epipleurae yellow."

(To be continued.)

New Species of Geometridae, No. 2.

By Geo. D. Hulst.

1. **Tetracis jubararia,** sp. nov.

Expands 42 mm. The size and much the shape of *T. aurantiacaria* Pack. The head and thorax are ochreous, palpi dark ochreous, dark brown at tip. Antennæ and abdomen light ochreous. The wings are orange ochreous, quite uniform. The t. a. line is rounded, angulate at the middle, the t. p. line oblique, sinuate; both dark brown and heavier than usual. There is also a basal cross line of the same color, starting at costa and running straight across reaching inner margin at t. a. line. Fringe reddish brown. The wings are much marked with brownish striations on the outer third. Hind wings lighter ochreous, darkest without. Outer line on the inner half of the wing. All discal spots present and prominent above and below. Beneath hind wings ochreous, loosely but definitely striated with brown, fore wings light ochreous, and without striations along inner margin. T. p. line very dark and heavy on the anterior half only of all wings.

1 ♀, Wash. T. Coll. Holland. Between *T. aurantiacaria* Pack. and *T. mellitularia* Hust.

2. **Leucula lacteolaria** sp. nov.

Expands 36 mm. Head light ochreous. Body and wings thinly scaled pure silky milk white. On the fore wings are two jet black, very fine, slightly wavy lines, running parallel with each other, and the outer margin. The apex is very rounded, outer edge very retreating, the wing itself very narrow, so the lines are very oblique. There is an indicated basal line present. Fringes black along margin between veins. Beneath as above with lines fainter but distinct. Legs light ochreous or white, black in front.

1 ♀, Ariz. Coll, Hulst.

Differs from Guenee's species in that the veins are not marked with gray. The wings are much narrower. The lines are waved black much finer and more oblique, and the legs differ in color.

3. **Heterolocha ephelidaria** sp. nov.

This insect is of the same size and shape as *H. edwardsaria* Pack. of which it may be a variety. It is cream white in color, generally with-

out any striations and these always few and faint. It has no outer or inner darkening of color. It ordinarily has no indications of the t. p. line, though this when evident runs as in *H. edwardsaria*. I have seen specimens of *H. edwardsaria* where the marginal band was very faint but the color of the wings always remained yellow.

1 ♂, 1 ♀, Nev. Coll. Hulst.

4. Drepanodes syzygiaria sp. nov.

Expands 27 mm. Wings of a nearly uniform warm yellowish fawn. T. a. line wanting; t. p. line silky white, unmargined, very fine, réflected to costa at a right angle. Wings beyond t. p. line violet shaded. Beneath as above with indication of a marginal darker band. Discal spots black, small above on all wings, below on hind wings. Fore wings broad, hardly falcate almost rectangular. Costa strongly arched; antennæ strongly pectinated, very long.

2 ♂, Fla. Coll. Neumœgen, Hulst. Near *D. olyzonaria* and *D. perizomaria* but may be known especially by the much lengthened antennæ and nearly rectangular fore wings.

5. Geometra illustraria sp. nov.

Expands 38 to 44 mm. The form found in Cal. and referred to by Dr. Packard, (Geom. Moths p. 394), but not by him thought worthy a name. It seems to me however to be different from the eastern species. It is uniformly of much greater size; it is in color uniformly of a very different shade of green; the cross lines are narrower, not edged with yellowish or purplish, are much straighter; there is not the same tendency to a whitening of the veins on the submarginal space: there is none of the bluish cast upon the submarginal space. Till further knowledge is had, I think it must be considered a valid species.

Cal. Coll. Hy. Edwards, Hulst.

6. Anaplodes festaria sp. nov.

Expands 30 mm. Differs from *A. pistacearia* Pack. in being of a lighter more vivid silky green; by having two cross lines on all wings; by having the fringe pink, and a narrow margin of bright red on wings; by having the wings more extended and pointed. The green of the wings is much striated with white in long very fine silky lines, Cross lines fine, white, the inner rounded near base, the outer parallel with the outer margin.

1 ♂, 5 ♀ Cal. Ariz. Coll. Hy. Edwards, Neumœgen, Hulst.

7. Aplodes zygotaria sp. nov.

Expands 28 mm. Head ochreous in front, white on vertex. Antennæ white. Wings, body, aud anterior portion of abdomen deep pea green. Costa narrowly white. Fringes green. Lines white very like *A. mimosaria* two on each wing. Beneath all wings lighter green. Fore tibiæ green; otherwise legs white.

1 ♂, 6 ♀, Texas. Coll. Graef, Hulst.

8. Racheospila xysteraria sp. nov.

Expands 19 mm. Head and palpi red; antennæ and between antennæ white. Thorax light green; abdomen pink dorsally, white laterally and beneath. Tufts on abdomen white edged with red. Wings light green, two faint rather broad white lines on fore wings. Fore wings red at base of costa. Costa towards apex, and out-

er edge of all wings edged with red; hind wings red also on anal margin. At the middle of fore wings at margin, and at outer angle is a large red spot, also at middle of hind wings at margin. The red margin of hind wings broadens at anterior and anal angle. Discal spots red, annulate, white within. Fringe alternating white and red. Beneath nearly white, the red showing at apex, discal points, and marginal blotches.

1 ♀, Fla. Coll. Hulst.

9. **Nemoria tepperaria** sp. nov.

Expands 18 mm. Head, body, and wings dull ochreous green very much as in some specimens of *N. subcroceata* Wlk.; the antennæ and head between lighter. Palpi pink on last segment. Wings crossed outwardly by a very faint white line, determinate principally on the veins, parallel to the outer margin; an inner line very faintly indicated on fore wings; hind wings quadrate, undulate on outer margin, with a very prominent angle at middle. All wings with a very narrow brown marginal line. Beneath much lighter, unicolorous. Legs very light ochreous, except fore tibiæ which are pink.

1 ♂, 1 ♀, Ga. N. Car. Coll. Edwards, Tepper.

This insect has the general appearance of *Nemoria subcroceata* Wlk. but is easily recognised by the undulating outer margins, and exaggerated angle on hind wings, and dark brown marginal line.

10. **Eucrostis hollandaria** sp. nov.

Expands 27 mm. Front ochreous, antennæ and vertex white, palpi very long as in *Racheospila*, bright red. Thorax and wings deep green. Costa white, fringe and narrow marginal line red, interrupted by green at end of veins. No cross lines present, but in their place near base of fore wings are three brownish red points forming a curve, and outwardly a row of points of same color, nearly parallel with edge of wing, one on each vein. Near anal angle two are very much enlarged (the anterior one much the larger) become confluent, and inclose each a pure white space. On hind wings an outer bent row of same colored points, one on each vein, with the one nearest inner margin much enlarged, annulate, inclosing white space. Discal points distinct, brownish. Beneath light green, fringes as above. The annulate spots above are reproduced though less distinct; discal spots as above, but less distinct. Other points very faint or obsolete.

1 ♀, Fla. Coll. Holland.

Eucrostis jaspidiaria, sp. nov.

Size and markings of **E. hollandaria** differing principally in that there are no annulate spots on any of the wings. Color a darker green. Wings more pointed, less rounded.

2 ♂, Fla. Coll. Hy. Edwards, Hulst. I name this with a strong suspicion it may prove to be the ♂ of the preceding species. But the prominent point of difference the annulate spots is remarkable, and so far as I know unique, and till further knowledge is obtained I must regard the species as distinct.

12. **Eucrostis saltusaria** sp. nov.

Expands 20 to 26 mm. Front bright green, palpi, tibiæ, and femora of fore legs, red. Vertex and antennæ white, the latter ochreous beneath. Thorax and base of abdomen bright green. Posterior part of abdomen white. Wings rather a dull deep green. Fore wings with a narrow white basal line, zigzag with two sharp angles outwardly. Discal spots long, white, angular, those on hind wings forming a

continuation of basal line on fore wings. Outer line much bent on both wings, towards and below middle scalloped with points on veins and these continued on veins to a marginal white line broader below apex and at inner angle, the latter space inclosing a deep red somewhat broken spot, which in the ♂ is continued part way along the edge as a marginal line. Hind wings as fore wings, with inclosed red spot at anal angle, connected along edge as a marginal red line. Fringes dull white. Beneath very pale green, lines very faintly reproduced.

2 ♂, 2 ♀. Fla. Coll. Hy. Edwards, Neumoegen, Hulst.

This insect has very strongly the appearance of a *Phoradesma*, but the tibial amature of *Eucrostis*.

13. **Chlorosea græfiaria** sp. nov.

Expands 34 mm. Palpi white, front reddish brown, antennæ white ochreous below. Thorax and forewings white faintly tipped with green. Abdomen and hind wings pure white the latter along the outer margin very faintly tinged with green. All fringes green. A single outer somewhat broad white line on fore wings, oblique, nearer outer edge than in *C. nevadaria* and starting from costa nearer apex. Beneath pure white with very faint greenish tinge on fore wings along costa. Legs white.

2 ♀, Nevada, Coll. Graef, Tepper.

14. **Cheimatobia bruceata** sp. nov.

While describing the above *Geometridæ* I wish to call attention to what is to me a very interesting addition to insect history. One of our common Geometers is the so called *Cheimatobia boreata* Hubn. The insect described under this name is common in Europe. It has been rather remarkable that, till very lately, the ♀ has never been discovered in America. Dr. Packard says in his Monograph the ♀ has never yet been taken, and till last spring I heard no account of it. At that time I received a letter from Mr. Bruce of Brockport N. Y., saying he had carried larvæ through to imagines, and that the ♀ was entirely different from *C. boreata* Hubn. of Europe, and that this insect, which had been looked upon as identical with another, was a very different thing. Mr. Bruce asked me to give it a name, which I do by giving it the specific name of *bruceata*, after the veteran and successful Lepidopterist who ascertained its history.

The ♀ of this species, (I have several before me), is almost entirely wingless. It has just the merest rudiments of wings. And from its color and size, I have no doubt that it has, if taken, been looked upon as the ♀ of one of the species of *Anisopteryx*. It is of a grayish black color. Antennæ and legs annulated with white. Thorax and abdomen marked above more or less with blackish. It is rather small, the dried specimens being 5 to 7 mm. in length.

After knowing that they are not the same, it is easy to note differences in the males of these two hitherto confused species. In *C. bruceata* the cross lines are finer, more distinct, more evenly scalloped, and more numerous in the average of specimens than in *C. boreata*. The wings

are more uniform in color, and show less of a tendency to a band; the veins are more distinctly lined and the outer angle is less rounded and retreating. The submarginal line on the fore wings is less rounded in at the costa, and on the hind wings is much nearer the outer margin.

The ♀ of *C. bruceata* can not be *Phigalia cinctaria* French, Ills. Reports Vol. VII, p. 241, described from the ♀ only, as the wings are much more developed in *cinctaria*, and the insect is more than twice as large apart from differences in details.

Note on Quadrina diazoma, *Grote.*

By John B. Smith.

In Mr. Grote's catalogue of 1882, *Quadrina diazoma* is placed in the "*Hemileucini*" and is associated with *Hemileuca*, *Hyperchiria* and *Coloradia*, which are all typical *Bombycids*. The genus and species had been a great puzzle to me, and being unrepresented in N. Y. collections I wrote Prof. Snow, for information. On a recent visit to Washington, Prof. Snow kindly brought me the unique type which is in poor condition. I saw at a glance thatthe insect was wrongly placed in the catalogue, and very little study decided me in placing it with the *Cossidae*, with strong tendencies in appearance to *Hepialus*-a tendency which the venation of the primaries emphasizes, while the secondaries are *Cossid.* Primaries with 12 veins, the 1st or only internal being sinuate. The cell is very short, and the median vein gives rise to 2 near its inception; to 3 at about its middle, and to 4 and 5 close together at the tip: 6 and 7 are on a stalk from the end of the subcostal vein: 8 arises near the tip, 9 and 10 are on a stalk about one third from tip, and vein 10 runs to the apex: v. 11 runs from the middle of the sub-costal to the costa about one-fifth from tip. The cell is closed by an angulated vein at tip. On the secondaries there are two internal veins. The cell is shorter than in the primaries and is closed in the same way; 2 arises from the middle of cell, 3, 4 and 5 close together at the tips: 6 is straight from the upper angle of cell and a direct continuation of the sub-costal: 7 arises from the sub-costal close to base and is connected near its inception by a cross vein with the costal vein, which is sinuate and has a short spur at base. Essentially this is also the venation of *Gloveria*. There appears to be no frenelum. The tongue is obsolete and the palpi are short. The antennæ are moderately long the joints very short, lengthily bipectinated. There appear to be no ocelli. The legs are moderately long, the median and hind tibiæ each with a pair of short terminal spurs. The anterior tibiæ have the epiphyses reduced to a small tubercle in a shallow depression. The tarsi are strongly spined and the claws are simple. In color the insect is a dull, even luteous red with traces of an outer broken black band. Altogether this is a remarkable insect, and the genus is probably a good one, nearly related to *Gloveria* but belonging to the *Cossidæ*.

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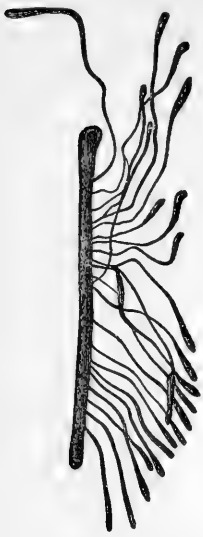
Notes on Scolytus unispinosus, *Lec.*

By JOHN B. SMITH.

A few days since (July 12, '86.) Mr. L. E. Ricksecker of Sylvania, Occidental P.O. Calif. sent me a section of Douglass spruce (*Abies douglasii*) infested by a Scolytid, about which he writes as follows: "The wood is a small section from the upper limb of a Douglass spruce, which was cut down on April 9th '86. Many species of Coleoptera attacked the tree on the same evening in a perfect swarm. Next day and thereafter but few of these were seen. Other species however made their appearance, and among these were numbers of *Scolytus unispinosus* Lec. For a week I could see them moving hurridly up and down the limbs of the prostrate tree. Then they became less, and by May 6th only a few stragglers could be found.

Noticing that something was boring in these limbs and throwing out little piles of dust, I cut out patches of bark, and found in every case two *Scolytus* occupying a straight gallery; one, presumably the male, being at the opening, and the other at the far end. At that date, May 6th to 10th, the burrows were about an inch long—now (July 4th) the main burrow is two to three inches long, with about 26 side galleries on each side, diverging therefrom. The parent beetles are gone, but at the end of each side gallery is a larva, working farther and farther away from the main gallery. They work only in the layer of bark nearest the wood leaving a slight impression of their galleries on the wood. When full grown they turn towards the surface and there await their transformations."

To this interesting account of Mr. Ricksecker a few notes based on the specimen (now in the National Museum) and on the literature, may be not uninteresting.



The specimen shows two complete main galleries with the larval galleries—about 30 in a length of one and three-quarter inches—at irregular intervals on each side. These extend at first at right angles. with the main gallery, but become sinuous almost immediately, and the larvæ change their direction, working upwards above, and downwards below the middle of the main burrow. Those larvæ nearest to the centre work longer at right angles but eventually turn either upward or downward, and sometimes change the course of the gallery. One gallery shows a larva that first worked at right angles for a distance and then started downward until it came very close to another gallery—rather than enter this it changed its course, went obliquely upward for a distance and then again turned downwards at rightangles. Two larval galleries from the same main gallery rarely cross each other, but sometimes two main galleries are close together and then the larval galleries cross and re-cross in the wildest confusion. The main galleries are sunken about as deeply into the wood as in the bark; but the larval galleries are deeper in the bark. At the point of entrance there is an enlargement of the gallery of a size sufficient to permit the beetle to turn.

There are also, in the specimen, five main galleries with either no larval galleries at all, or just started. One of these galleries is interesting for here the beetle came in, formed a small cell, and started downward for half an inch, then changed its mind, and, turning, started upward for about an inch. In the main galleries no eggs seem to be laid within 4 mm. of the entrance. Before the parent beetle has finished its burrow the eggs laid nearest the entrance have hatched and the larval galleries will be from 3—4 mm. in length at the entrance before the last eggs are deposited.

In general appearance the galleries of *unispinosus* resemble most nearly those of the European *Sc. intricatus*. But the most interesting point in Mr. Ricksecker's communication is the food tree. No other species of *Scolytus* whose food habits are recorded lives on *Conifers*. All attack deciduous trees. So striking a departure from the general habits of the genus is rather remarkable and furnishes another instance of the dangers of "reasoning from analogy". Mr. E. A. Schwarz has kindly

furnished me with a list of food plants of the European and American species which is as follows:

Sc. amygdali = Amygdalus.
Sc. Ratzeburgi = Betula.
Sc. carpini = Carpinus.
Sc. pruni and *rugulosus* = Pyrus, Prunus, Cratægus.
Sc. intricatus: Quercus.
Sc. Geoffroyi, pygmaeus, Kirschi. multistriatus = Ulmus.

The American species of which the food habits are known, are the following:

Sc. quadrispinosus: Carya,
Sc. fagi: Celtis, Fagus (?).
Sc. muticus: Celtis.
Sc. rugulosus: Prunus, Pyrus. (Imported from Europe.)
Sc. unispinosus: Abies Douglassi.

Of the remaining five species *Sc. californicus* is tolerably common in collections, but the others appear to be exceedingly rare: in fact it is questionable whether any but the typical specimens are known. The second food plant of *Sc. fagi* (Fagus) is somewhat in doubt. Dr. Leconte (Rhynch. p. 372) says: "depredates on beech trees according to Mr. Walsh"; but on referring to Mr. Walsh's original article (Pract. Ent. II, p. 58) we find the following statement: "I obtained many specimens in South Illinois, from what I believe was a beech." Thus it still remains somewhat doubtful whether the species really infests the beech.

Dr. Hamilton states (Can. Ent. XVII, 1885, p. 48) that *Scolytus rugulosus* breeds in Hickory twigs, but Mr. Schwarz (Proc. Ent. Soc. Washington, I, No. 1, p. 30) maintains that this Hickory species is different from *rugulosus* and apparently undescribed.

In the Entom. Mo. Mag. Sept. 1886 p. 85, Mr. George Lewis describes a *Brathinus oculatus* from Japan. Hitherto this genus has been supposed to be exclusively American, two species being known in our fauna. The occurence of the species is therefore of great interest to students of Geographical distribution.

* * *

In the Stettiner Ent. Zeitschrift Vol. 47, p. 215, Martin Jacoby describes *Oedionychus cretica* from the Island of *Creta*. This is also a new locality for this genus which is very rich in America, rare in Madagascar and Siam and has not been heretofore known in the European fauna.

Descriptions of some New Trap-Door Spiders; Their Nests and Food habits.

By Geo. F. Atkinson.

(Continued from p. 117.)

DESCRIPTIONS.

Prefatory Note. It is not surprising that in a collection of some 40 specimens there would be found several species, nor that a large number of these would prove to be new and undescribed forms, where so little attention has been given to spiders in general, and especially those of the order *Territelariæ*, as has been given in America.

It has been a great pleasure to me to observe the nests and habits of so many of these creatures, which by their solitary and secluded life generally escape our observation. It has seemed necessary, that, in connection with interesting descriptions of their nests, architectural and food habits, these forms should be described and named. So interested have I become during the past year in the work of N. M. Hentz, that it would have given me more pleasure to find a specimen described by him than to find a new form. I feel sure that I have found one of his species, and possibly one other related species. I undertook the work of description with great reluctance, and have found it to be no small task. But my labors have been greatly lessened, and I have been sensibly encouraged by the kindness of Dr. Geo. Marx, of Washington, Prof. J. H. Emerton and Samuel Henshaw of Boston. Dr. Marx loaned me works from his private library, Prof. Emerton, placed for my study his excellent collection of Arachnological publications, and specimens for comparison, which are now in the Mass. Inst. Tech., and showed me further kindness in directing me to the most useful works in the Library of the Boston Natural History Society, Mr. Henshaw also aided me in the same way and gave me the use of the specimens of *Territelariæ* which are in the Museum of the Society.

I have also found works in the Boston Public Library which have aided me.

In the value of generic and specific characters I have been guided by those adopted by Anton Ausserer[1], and the Rev. O. P. Cambridge[2], who have given considerable study to members of the *Territelariæ*.

I have followed the classification adopted by Ausserer in his *Beitraege zur Kenntniss der Territelariæ*.

[1] Beiträge zur Kenntniss der Territelariæ, Auss. 1871, and Zweiter Beitrag etc. 1876.

[2] Encyclopedia Britannica, 9th, Ed. pp. 291 and 597, Harvesting Ants and Trap Door Spiders, Moggridge, and Supplement.

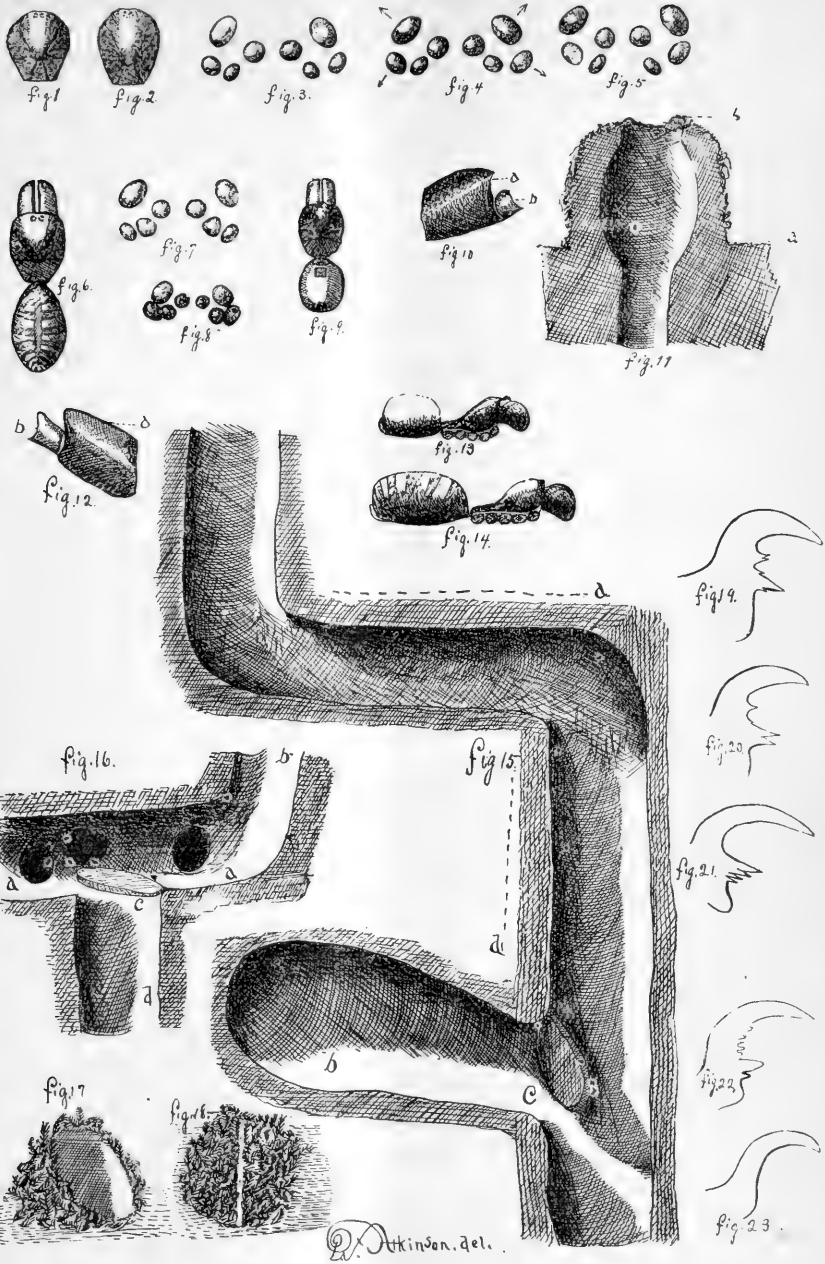

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fig.18
fig.19.
fig.20
fig.21.
fig.22
fig.23.
W. Atkinson. del.

I subjoin, for clearness a brief synopsis of his Classification.

Suborder *Territelariæ*. This was divided by Thorell into 3 families, as follows:

2, lung sacs ..... *Cataidisoidæ*.
4, lung sacs.
a. Without spinnerets ..... *Liphistoidæ*.
b. With spinnerets ..... *Therophosoidæ*.

The family *Theraphosoidæ*, Thorell, is further divided into three subfamilies as follows:

Maxillæ well broadened at the base, palpi inserted laterally,.. **Atypinæ** Thorell.
Maxillæ little broadened at base, palpi inserted laterally,..... **Eriodontinæ** Ausserer.
Maxillæ not broadened at base, palpi inserted on the end,..... **Theraphosinæ** Thorell.

The *Theraphosinæ* are then further divided into two groups, based on the relative elevation of the caput above the thorax.

a. Caput well elevated, ... *Aepicephali*.
b. Caput not much elevated, ... *Tapinocephali*.

In specific descriptions I have endeavored to not repeat characters which seem at present generic, so that in most cases it will require both the generic and specific characters to identify a single species; for this reason I have given the characters of the genus *Pachylomerus*, established by Ausserer.

Family **THERAPHOSOIDAE**, Thorell.

Subfamily **Eriodontinæ**, Auss.

1. Genus **Nidivalvata**, n. gen.

(*nidus*, nest, *valvata* having folding doors.)
(Pl. V, figs. 8, 9, 10, 13, 23.)

Ceph'x little longer than broad; greatest breadth at middle, tapering very gently and equally to both ends; edges of posterior half slightly scalloped; small, deep, circular, depression in center from which radiate to edges of ceph'x 6 depressed lines quite well marked. Caput well elevated, sloping to thorax gently, not broadly arched as in *Myrmekiaphila*. In front, caput gently drawn to a short blunt point about which the eyes are crowded. Eyes can be better described by speaking of them as being in three groups; the ant-centrals a diameter or less distant and situated at the top and on sides of the hill; on each side of these, not far separated is a group of three eyes forming a crescent with the concavity toward the middle group; the eyes in this group nearly or quite touch each other. Fig. 8, Pl. V, represents the eyes as seen from the front at an angle of 45° to a plane parallel with the base of the ceph'x.

With this view the ant- and post-laterals form a trapezium, base at post-laterals one-fourth larger than opposite side; height about one-third of base, post centrals slightly in front of base of trapezium. Ant-laterals comparatively large; others varying in relative size in different species, and it may be found, that the relative position varies also as in *Pachylomerus*. Maxillæ extended in front, but not so much as in *Eriodon*. Fig. 10 represents a maxilla showing insertion of palpus. Labium triangular, distal end rounded, longer than broad at base. Mandibles strongly kneed in front of perpendicular clypeus.

About half or less than half as long as ceph'x., broad and deep, armed with a comparatively strong fang; the inner edge only of furrow for reception of fang armed wi h teeth; upper and inner edges of anterior half armed with short spines, which also extend part way around base of fang.

Legs 4, 1, 3, 2. 4, 1, 2, 3, or 4, 1, 2, 3; palpi long. 3 tarsal claws. Claw of palpus unarmed, Abdomen short oval. Spinnerets 4 pair, the upper pair long and slender.

1. **Nidivalvata marxii**, n. sp.[1] ♀ 1 specimen.

(Pl. V, figs. 8, 9, 10, 13, 23.)

Ceph'x broadly oval 6 mm. long by 5 mm. broad. Caput back of ocular prominence not perceptibly elevated, slope down to depression in center of ceph'x gradual. Caput in front not much contracted on sides.

Radial depressions all quite deep; the posterior one of the laterals on each side seeming to unite with the central depression. The depressions, though distinct in this specimen, have deepened somewhat by alternately being in alcohol and in the air while being studied.

In each anterior radial depression on sides of base of caput is a well marked depression, though not deep,

Post-central eyes fully as large as the ant-centrals, eyes of the outer group almost or quite touching. Ant-laterals dark orange, remainder transparent, legs. 4, 1, 3, 2. 3rd 12 mm., 2nd 11½ mm. Sternum longer than broad, with three distinct circular punctures on each side. Abdomen broadly oval and bluntly rounded at each end; on ventral surface narrowed in front.

Armature. Very few hairs; short and fine on abdomen, longer and darker on the 4 distal joints of legs. Metatarsus IV, with a row of spines on each side, and one on under side, with additional spines at each end; tibia IV, with few long spines irregularly placed on upper side, 3 distinct rows, two on under side and one on anterior side, with extra spines at each end. Patella two double rows of spines on upper surface. Metatarsus III, 4 rows of spines, two upper and two lower edge: spines irregularly placed on upper side. Patella III, patch of spines on upper anterior surface, broadest at distal end; this is separated from a few spines on the posterior surface by an oblique rounded line. Metatarsus II, two double rows of spines, one on anterior surface, and one of long spines on under surface; tibia II and I, double row of long spines on under surface, and single row of short spines on anterior surface. Metatarsus I, three rows of long spines on under and anterior surface. Palpus, tarsus and tibia a somewhat double row of long spines on each side; patella, one or two spines on anterior surface.

Labium separated from sternum by a deep furrow.

Colors. Upper surface Ceph'x and legs, olive brown. Under surface legs dull yellowish. Sternum a little darker. Maxillæ dull rufous, with reddish hairs. Ocular prominence black. Abdomen dull yellowish underneath, brownish yellow above, with two rectangular rich dark brown spots on anterior end. Mandibles rufous. Colors little changed in alcohol, not so bright however, and marks on abdomen disappeared.

2. **Nidivalvata angustata** n. sp. ♀ 2, specimens.

Ceph'x oblong, 5¾ mm. long by 4 mm. broad. Caput in front below eyes perceptively narrowed; caudad of ocular prominence perceptibly elevated, making the descent to the thorax steeper than in *N. marxii.* Legs 4, 1, 2, 3. Anterior central and lateral eyes dark, the others light; posterior centrals much smaller comparatively

[1] In honor of Dr. Geo. Marx.

than in *N. marxii*, and the lateral groups of three distinctly separated. Radial furrows on thorax not so deep as in *N. marxii*, Otherwise the same.

II Genus **MYRMEKIAPHILA**, n. gen.

(*murmekia*, ants nest or hill, *philos* loving.)

(Pl. V, figs. 6, 7, 12, 14 and 22.)

Ceph'x perceptibly longer than broad, nearly $\frac{1}{3}$: crescent shaped depression $\frac{1}{3}$ distance from posterior edge, convexity caudad, ends not so extended as in *Pachylomerus*; 6 radial lines, sometimes quite indistinct. Greatest width about the middle, narrowing gently to the anterior end, and more perceptibly toward posterior end. Caput large, high and broadly arched in the anterior $\frac{2}{3}$, then steeply descending to depression and also narrowing on the sides to this point.

Eyes. Anterior and posterior laterals forming a rectangle, the height of which is equal to two-fifths the base. Ant-laterals oval, largest; post-centrals near the post-laterals; ant-centrals in a line about $\frac{2}{3}$ from base of rectangle. Legs 4, 1, 2, 3. Labium, trapezoidal, shorter than broad at base. Maxillæ extending forward not quite so much in proportion as in *Nidivalvata*. See fig. 12, Plate V.

Mandibles, half or more than half as long as ceph'x slightly kneed in front of margin of caput, armed with a strong fang.

Inner edge only of groove for reception of fang armed with short teeth; front of mandible, on the inside of the insertion of fang drawn out into a three cornered toothed projection, much as in *Pachylomerus*, but a little smaller; short teeth along anterior half of inner upper edge of mandibles, and few at base of fang. Abdomen elongate, cylindrical, tapering gently to each end. Spinerets 4, upper pair medium size and length.

I have been somewhat in doubt about placing this genus in the subfamily *Eriodontinæ*, as it has some affinities with members of the subfamily *Theraphosinæ*, division *Æpicephali*. But I think, after a comparison of the maxillæ, with those of *Cteniza*, *Nemesia*, and *Eurypelma*, some species of which have a prolongation of the inner distal end, that the character of the maxillæ would place it in the subfamily *Eriodontinæ*. If however it should prove to belong to the *Theraphosinae*, it would constitute a genus related with, *Aepycephalus*, *Cteniza*, *Cyrtocarenum*, and *Cyrtauchenius*, in the group *Aepycephali*. It can however be separated easily from these genera by the following characters.[1]

Aepycephalus. "Head high and somewhat pointed, ceph'x broad as long, side eyes form a trapezium, lip broad as long etc."

Cteniza. "Side eyes form a trapezium. Lip somewhat three cornered, spinnerets short and thick. Abdomen great, eggformed etc."

Cyrtocarenum. "Ceph'x as in *Cteniza*; but head broader in front. Eyes occupy whole breadth of head, abdomen and spinerets as in Cteniza etc."

Cyrtauchenius. "Form of Ceph'x, and position of eyes as in *Cyrtocarenum*, mandibles not drawn into a point etc."

As the nesting and food habits singularly resemble those of members of the genus *Nemesia*, and the form of the abdomen also, it might be confounded with that genus, which belongs to the group of *Therapho-*

[1] Beiträge zur Kenntniss der Territelariæ, Auss. pp. 150, 151, 152, 156 and 161.

since called *Tapinocephali*, as *Nemesia*, being related to the genera above mentioned represents the passage from the *Aepycephali* to the *Tapinocephali*. The generic characters given by Ausserer[1] however easily distinguish it.

Nemesia. "Head low, little elevated above the thorax. Depression with the concavity behind."

The specimen of *Nemesia caementaria* which I saw in the Museum of the Boston Soc. of Nat. Hist is readily distinguished generically from this.

1. **Myrmekiaphila foliata**, n. sp. ♀ 5 specimens. (Pl. V, figs. 6, 7, 12, 14, and 22.)

In addition to the generic characters are the following specific characters. Anterior central eyes[2] situated from each other about one diameter. Posterior lateral eyes a little larger than the ant-centrals. Post-centrals slightly angulated, a little smaller than the ant-centrals, each one about a diameter distant from the corresponding post-lateral, and situated a very little cephalad of the base of rectangle bounding the lateral eyes. Ant-centrals on point of hill higher than the others. Ant-laterals lowest; these and the post-laterals situated at base of the low hill for the eyes.

Legs of one of largest specimens. 4th, 21 mm. 3d, 14½ mm. 2d, 16 mm. 1st, 17 mm,, palpus 11.5 mm. Ceph'x 9 x 7 mm.

In the anterior radial lines, on each side of the caput is an elongated shallow depression. Two lateral radials on each side show a long, narrow, shallow depression, post radials indistinct in some. Edges of ceph'x slightly crenate, and showing shallow, irregular depressions: posterior margin emarginate. Caput 3.5 mm, elevated above thorax.

Sternum 5 mm long by 3.75 mm broad, broadest part one-third distance from posterior end, distinctly angled. Labium slightly emarginate. Abdomen 10 mm long by 7 mm broad.

Armature. Very few hairs, more perciptible on abdomen, and still more so on the three and four distal joints of the legs, where the hairs are darker. Tarsus IV one or two spines on anterior side. Metatarsus IV with four or five long spines on under side, distal end 1 or 2 near centre. Tibia IV with scattered stiff hairs. Patella IV, upper and anterior side with numerous slender spines, with quite a strong base. A broad longitudinal denuded space on upper side, divides this patch of hairs. Femur IV with a number of spines on distal upper end. Tarsus III, 2 spines on under side. Metatarsus III, 1 or 2 spines on under, distal end, 1 or 2 more near middle; two rows 3 or 4 spines each on upper anterior, and posterior edge. Upper surface of tibia and patella III, covered with spines, which are divided into two patches by an oblique, denuded, narrow space, Tibia III, shorter than patella III. Tarsus II, 1 or 2 spines on posterior under edge; metatarsus II and 1 with 2 or 3 spines on under, distal end, and 2 or three near middle. Dense row of hairs on anterior and posterior side of tarsus and metatarsus I; palpus, tarsus as in I; tibia with spine on under distal end, and one or two near middle. Labium separated from sternum by a deep

[1] Beiträge zur Kenntniss der Territelariæ, Auss. p. 165.

[2] It seems unnecessary to repeat the description of the eyes so far as given for the genus. Some variation should, however be allowed for other species which may be found.

furrow. Maxillæ and labium with very short, brown, strong spines at the oral extremities.

Colors. Ceph'x dull olive with a rufous tinge; legs more decidedly rufous, except the femora which are paler and indistinctly tinged with green. Mandibles, sternum, maxillæ and labium decidedly rufous. Ends of mandibles darker. Ocular prominence black; posterior eyes light; others usually black. Abdomen dull yellowish; broad longitudinal dorsal band of delicate brown, from which branch on each side 7 bands of same color, extending down midway of abdomen. Above colors from alcoholic specimens. In some specimens the alcohol has entirely effaced the foliation on the abdomen, but it was distinct in all the specimens when alive. When alive the femora were of a delicate light, olive green.

Subfamily **THERAPHOSINAE.**

Group **Æpicephali.**

I. Genus *PACHYLOMERUS* Ausserer.

"Cephalothorax nur wenig länger als breit, lang, nach hinten allmählig abfallend. Die halbkreisförmige, nach vorn geöffnete Rückengrube etwas hochliegend, da von hier der Thorax nach hinten noch fast unter demselben Winkel sich abdacht wie der Kopf, während bei verwandten Gattungen hinter der Grube der Thorax fast horizontal verläuft. — Augen etwas gedrängt, auf niedrigem Hügel. Die vier ovalen Seitenaugen die grössten, mitsammen ein Rechteck bildend, dessen Höhe gleich der halben Basis. Vordere Mittelaugen höher stehend als die Seitenaugen. Mandibles stark, wenig länger als hoch, in eine mit Dornen bewaffnete Spitze vorgezogen. Falzrand beiderseits mit einer Reihe starker Zähne bewaffnet. Lippe so lang, als am Grunde breit, vorn zugespitzt. Die Extremitäten der beiden Hinterpaare auffallend verdickt, ihre Schenkel in der untern Hälfte bauchig aufgetrieben. Tibia III kürzer als Patelia III, oben an der Wurzel mit tiefem Eindrucke. Die beiden vorderen Fusspaare und die Palpen ♀ etwas schwach, ihre beiden Endglieder unten flach und beiderseits mit einem breiten Bande kurzer, starker, dichtgedrängter Stacheln bewaffnet. Abdomen mässig gross, eiförmig. Spinnwarzen vier, etwas dick und kurz."[1]

Ausserer takes *P. glaber* Dall., as type of this genus and says: "ob die übrigen vorläufig hier eingereihten Arten wirklich hierher gehören, lässt sich bei den etwas mangelhaften Beschreibungen nicht mit voller Sicherheit bestimmen."[2]

P. carolinensis Hentz, was one of those to which he refers. I think he was right in placing it in this genus, but for the relative position of the eyes, and some slight difference in the form of the labium there should be allowed some variation in generic character, which he undoubtedly would have done, had he the opportunity to see the specimens.

1. **Pachylomerus carabivorus**, n. sp. ♀. 5 specimens. (Plate V, figs. 1 and 4, and 20.)

Eyes. Anterior and posterior laterals forming a trapezium; base of which formed by the post-laterals one-fifth longer than the opposite side. Height about one-third of base. View of eyes taken perpendicularly to a plane parallel with the ven-

[1] Beiträge zur Kenntniss der Territelariæ, Auss., p. 145 and 146.

[2] Idem, p. 146.

tral surface of the ceph'x. With this view the ant- and post-lateral eyes appear elliptical in outline; but viewed from a point toward which each eye may be said to "look" they are nearly circular in outline, and appear like "dormer windows", from the arched portion of the caput for each one. Fig. 3, Plate V, represents position and relative size of the eyes as seen from the view explained above; the arrows indicate the direction from which the greater number of rays of light enter the eyes. A line through the center of the ant-central eyes would pass a little above a line half way between the base and opposite side of the trapezium; ant-centrals are situated from each other, and from the ant-laterals about one diameter; receive the rays of light directly from above. Post-lateral eyes in line with base of trapezium, or a trifle anterior in some specimens, receive the rays of light from a point caudo-dorsal. Ant-lateral, largest, ant-central and post-lateral of about equal size, post-central smallest, though in one specimen they are of equal size with the ant-central and post-lateral.

Ceph'x a little longer than broad at widest part. In one specimen 9 mm. x 8.25 mm., another 11 mm. x 10 mm. &c. U-shaped depression situated about two-thirds of the distance from the anterior margin of the caput. Base of ceph'x 3.5 mm; posterior angles quite sharply defined; lateral edge, from posterior angle to point of greatest width, straight. Greatest height of ceph'x, 6 mm. Mandibles 3.5 mm. long x 3 mm. deep. Abdomen 12 mm. long, whole length of spider 24.5 mm. Legs; 1st, 16 mm; 2nd, 15.25 mm; 3rd, 15.25 mm; 4th, 19.5 mm. These are measurements taken from one individual. In some the legs are 4, 1, 2, 3.

Armature. The legs have few hairs, though more abundant on tibia, metatarsus and tarsus, of all the legs, and patella III and IV.

Patella IV on sides of proximal half covered with very short spines. Anterior side of metatarsus and tarsus IV slender spines; a few spines on under side, distal end of tibia IV. Trochanter III with a short papilla. Anterior side and upper distal end of patella III, whole upper surface of metatarsus III, and distal end of tibia III, covered with short, strong, black spines. On upper side of proximal end of metatarsus III is an elongated denuded spot, which seems to be the miniature of the smooth depression at proximal end of tibia III; tarsus III with few spines. Tibia, metatarsus and tarsus of II and I, and tibia and tarsus of palpus, with dense row of short, strong, black spines on anterior and posterior sides.

Sternum with few hairs on edge, longer than broad, in one specimen 6.25 mm. by 5.75 mm., sharply angled between the articulation of the coxæ; greatest breadth between coxæ II and III.

Maxillæ longer than coxa I; at edge of base a clustered row of short, strong, brown spines; densely hairy with rufous hairs on anterior edge. Labium broadest at base, distal end truncate, anterior angles well rounded; as long or nearly as long as broad at base; armed near distal end with a few spines similar to those on the maxillæ; separated from the sternum by a deep furrow.

Colors. When alive. Ceph'x and legs deep glossy black. Abdomen light brown. Ends of mandibles, hairs on end of mandibles, and on anterior edge of maxillæ reddish. Patella IV also reddish on upper surface. Under parts lighter colored. Membrane connecting legs to ceph'x, and the joints of the legs whitish. When placed in alcohol the glossy black after a while disappears, and becomes a dark rufous brown, ends of legs remaining darker because of the presence of numerous very short, black spines.

Pachylomerus carabivorus. var. **emarginatus,** n. var. (♀, 1 specimen.)

This seems to be a varietal form of *P. carabivorus.* Labium trapezoidal, anterior corners rounded; shorter than broad at base. Ceph'x nearly as broad as long, 10

mm. long. Marginal configuration as in *P. carabivorus*, except that the posterior margin is strongly emarginate. Whole upper portion of ceph'x seems to be elevated, showing quite a breadth of membrane which connects it with the coxæ. Middle portion of caput, perceptibly elevated and broadened a little caudad of the eyes. Legs; 4th, 23.5 mm; 3rd, 19.25 mm; 2nd, 18.5 mm; 1st, 20 mm. In front of the U-shaped depression the caput is emarginate, the depression extending for a short distance cephalad in the median line. This is seen to a certain extent in some good specimens of *P. carabivorus*. Otherwise as in *P. carabivorus*.

Pachylomerus carolinensis, Hentz. ♀, 1 specimen. (Plate V, figs. 2 and 3, and 20.) Beiträge zur Kenntniss der Territetariæ, Ausserer, 1871, p. 147. Mygale carolinensis, Hentz., Boston Journ. IV, p. 56, pl. VII, fig. 3.

This specimen I am convinced is the same as the one described by Hentz as *Mygale carolinensis*. The description is very imperfect, and I take this opportunity of making it a little more complete, and easy to identify. His description is as follows. "Brownish, very glossy; cephalothorax with two slight impressions near the base; abdomen blackish, not glossy; third joint of the third pair of legs very short and crooked; feet 4, 1, 3, 2." The spinal armature is the same as in *P. carabivorus*, but the ceph'x and arrangement of eyes are quite distinct. Ceph'x longer in proportion to width than in *P. carabivorus*, 10 mm. x 8 mm. in this specimen. U-shaped depression situated more than two-thirds the distance from anterior margin of caput, making caput larger in proportion. In the curve of the U-shaped depression, there is scarcely any depression; a very faintly depressed line, which is quite readily seen because it is very dark, connects the two well marked depressions at the anterior ends of the U. As Hentz's specimen was a small one, these depressions would be smaller than in the specimen I have. Had it been a well marked U-shaped depression, he would have noted it, as he has in the case of *Mygale truncata*.[1]

Caput caudad of eyes slightly elevated, making the slope quite steep.

Radial depressions distinct, straight. Base of ceph'x 4 mm; angles not sharply defined; lateral edge from posterior angle to point of greatest breadth curved, with convexity outward, fig. 2, pl. V, represents the ceph'x of this species. By comparing it with fig. 1, can be seen the differences of the two species in the configuration and markings.[2] Fig. 3 represents the eyes of *P. carolinensis*; fig. 4 of *P. carabivorus*; fig. 19 tarsal claw, spur at base with a small spine on each side at its base; distad of this a spine divided at the end. Labium as long or longer than broad at base.

Eyes. Ant- and post-laterals form a trapezium as in *P. caribivorus*, but the ant-centrals are situated on a line halfway between the base of the trapezium and the opposite side; the post-laterals and centrals form a curved line with convexity caudad, instead of a straight line as in *P. carabivorus*.

Sternum as broad as long, 5 mm., broadest part one-third from caudal end.

Mygale solstitialis[3]. Hentz, I am inclined to think is the male of this species. The depressions in the ceph'x are similar, the difference in the lengths of the 2nd and 3rd pair of legs is not of much specific importance in many species. The depressions on the abdomen are just what will appear in any of these species, when the abdomen becomes

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[1] Boston Journ. IV, p. 55. Spiders of the U.S. N. M. Hentz, p. 16, pl. I, f. 1.

[2] The curvature of the lateral radials I do not think is constant.

[3] Boston Journ. IV, p. 56. Spiders of the U.S. N. M. Hentz, p. 17, pl. 1, f. 3.

small for want of food, or after the depositing of eggs. In nearly all specimens either one, two, or three, or more pair of circular depressions can be seen. When the abdomen shrinks the space between the depressed dots of each pair becomes depressed in the form of a rectangle as seen in Hentz's figure of *Mygale solstitialis*. The difference in color of the two is not of specific importance, for the young of *P. carabivorus* have a brownish ceph'x, the old a glossy black, and when transferred to alcohol, this soon changes to brown.

Pachylomerus turris, n. sp. ♀, 1 specimen, (Pl. V, fig. 5.)

Ceph'x 6.5 mm. long x 6 mm. broad. Marginal configuration as in *P. carabivorus*; lateral radial depressions in form of crescents with the concavities caudad; anterior radial depressions indistinct, but marked by a deep, small cylindrical puncture; armature same as *P. carabivorus*, with the exception of the lack here and there of a few spines, which may be accidental.

Sternum nearly as broad as long, distinctly angled between articulations of coxæ. Labium shorter than broad at base, nearly triangular, separated from sternum by a furrow.

Eyes. Upon the arrangement of the eyes is laid the greatest stress in establishing this species. Ant- and post-laterals forming a rectangle; posterior row curved with the convexity caudad.

Tuft of hairs on clypeus with few hairs; also very few hairs, or signs of their having been any, in the three lines caudad of the eyes.

Pachylomerus 4-spinosus, n. sp. (Pl. V, fig. 21.)

Eyes as in *P. carolinensis*. Legs 4, 1, 3, 2, tibia III with depression at proximal end, but distal end not enlarged as in the other species. Armature very distinct from the other species. Patella IV with a number of spines; distal end of patella and metatarsus III, two spines; two on proximal end of metatarsus and two or three on distal end of tibia III; row of spines on each lower side of II and I, arranged thus in each row, one on tarsus, two on metatarsus, and two on tibia; palpus with a row on each lower side, arranged 3 on tarsus, 2 on tibia, one on patella, and one on femur. Spines at base of maxillæ and on labium as in the other species of *Pachylomerus*. All the spines on the legs are medium length, and not short as in the other species. Ceph'x and legs pale rufous, abdomen light brown. Specimens young. Palpal claw is shown in fig. 21, plate V, at base is a large short spine, which has four divisions at the terminal end, the distal one the longest, and the others decreasing successively in length.

EXPLANATION OF PLATE V.

Fig. 1. Ceph'x of *Pachylomerus carabivorus*.
" 2. " " " *carolinensis*.
" 3. Eyes of " "
" 4. " " " *carabivorus*.
" 5. " " " *turris*.
" 6. *Myrmekiaphila foliata*, dorsal view.
" 7. " " eyes of.
" 12. " " maxilla of.
" 14. " " side view.

Fig. 9. *Nidivalvata marxii*, dorsal view.
" 8. " " eyes of.
" 10. " " maxilla of.
" 13. " " side view.
" 11. " *angustata*, nest of.
" 15. Nest of *Myrmekiaphila foliata*; dotted line at *a* represents bottom of place where stone lay. Space represented by dotted lines *a* and *d*, much foreshortened; *b*, where spider was caught; *c*, trap-door.
" 16. Nest of *Myrmekiaphila foliata* in an ants nest; *a a*, landing in ants nest, leading off into galleries; *b*, entrance to ants nest; *d*, tube of spider; *c*, trap-door.
" 17. Nest of *Nidivalvata marxii*, open.
" 18. " " " " closed.
" 19. Palpal claw ♀, of *P. carolinensis*.
" 20. " " ♀, " *P. carabivorus*.
" 21. Palpal claw of *P. 4-spinosus*.
" 22. " " ♀," *M. foliata*.
" 23. " " ♀," *N. marxii*.

Figs. 1, 2, 6, 9, 13 and 14, about natural size.

ERRATA.—In the first part of this article, pp. 109–117, for *caribivorus* wherever it occurs, read *carabivorus*; for **Notes**, in title, read **Nests**; p. 110, line 7, note [1], for Canes, read Cannes.

Note on the secondary sexual characters of some North American Coleoptera.

By E. A. Schwarz.

Hydrophilus ovatus. The two sexes differ not only in the structure of the front tarsi but also in that of the maxillary palpi which, in the female, are slightly compressed, the three joints being about equal in width. In the male, the palpi are much more compressed, especially the second joint which is twice as wide as the last. I can hardly believe that this obvious character should have been hitherto overlooked, still I find no mention of it in the literature at my command. It is not alluded to by Dr. Horn (Can. Ent, XVII, 1885, p. 137–138).

Mycetoporus americanus and *flavicollis*. In addition to the sexual characters mentioned by Dr. Horn (Trans. Am. Ent. Soc. VI, p. 123) I notice in the males of the above species a peculiar structure of the seventh abdominal segment. This is broadly emarginate at apex and its surface (so far as visible) covered with a dense filamentous vestiture which is longitudinally striate, projecting in two lobes beyond the apex of the segment. The lobes are divergent, narrowing toward the tip and terminating in a fine seta. This structure is the same in the two species which do not appear to differ except in coloration.

Telmatophilus americanus. Judging from the description, the European species of this genus do not differ essentially in the two sexes but the male of the only North American species shows a remarkable modification of the hind tibiæ. These are compressed and, excepting at the very base, much broader than in the female; the outer edge is straight but furnished near the base with a large subtriangular plate which is very thin and semi-transparent. On the inner edge the tibia is concave at basal fourth, then obtusely angulated, thence straight, the tibia gradually narrowing from the angle to the tip. In addition to this character the last ventral segment has a round but rather shallow excavation near the apex. I know of no other Cryptophagid which is so strikingly marked in the male sex.

Axinocerus americanus. The remarkable antennal characters of this genus described and figured by Dr. Jayne (Proc. Amer. Philos. Soc. XX, p. 367, fig. 63) are those of the male sex. In the female the antennæ are 10-jointed,[1] the two basal joints like those of the male, the third much narrower, a little longer than wide, the following 5 very small, transverse, gradually increasing in width, the penultimate joint strongly transverse, more than twice as wide as the preceding, the last joint compressed, slightly transversely oval (when viewed from the broad side), much smaller than the corresponding joint in the male and hardly twice larger than the first antennal joint. This rare species occurs also in southern Georgia.

Scaphidium quadriguttatum. Male: Metasternum in front of hind coxæ rather coarsely and densely punctate and furnished with sparse yellowish pubescence, median line obsolete behind the middle. Hind tibiæ on inner side with a fringe of fine hair.

Female: Metasternum not concave, glabrous, with a few very fine, scattered punctures, median line entire and enlarged near the middle into an oblong groove. Hind tibiæ simple.

Malthodes captiosus. In 1882 I found at Deer Park, Md., a species of *Malthodes* in the male of which I found a sexual character not mentioned in any described species of the genus. I forwarded the specimens to Dr. Leconte calling his attention to my observation, and he wrote me that the species was *M. captiosus* but that in describing this species he had overlooked the best character. The character referred to, is of sufficient importance to deserve mention although no specimen is now before me and I describe solely from memory. In the male the sexual characters are not confined to the structure of the abdomen (as described by Dr.

[1] I may be mistaken in the number of joints but the single specimen before me is in rather unsatisfactory condition.

Leconte) but the hind tibiæ are also affected. These are slightly bent, the apical half of inner edge emarginate and the emargination filled with a brush of fine hair.

Malthodus parvulus. This, our smallest and at the same time commonest species of *Malthodes* acquires a special interest from the fact that the male still remains entirely unknown. In our other species of *Malthodes* the males are not rarer than the females, but of this *pusillus* I have myself, during the past three years, examined more than 200 specimens without finding among them a single specimen that could be considered as the male. The specimens I saw in Dr. Leconte's collection marked as males are undoubtedly females in which the last abdominal segment became accidentally lengthened and somewhat distorted in the process of drying

Xylophilus fasciatus. Male: Anterior tibiæ with the outer edge strongly curved, inner edge strongly sinuate, almost angulate at middle. Posterior femora clavate and suddenly widened a little beyond the middle; inner edge of hind tibiæ with a row of fine hair and with a slight dilation near the base, terminal spur long.

Female: Anterior tibiæ, posterior femora and tibiæ simple, the latter with the terminal spur short. Last antennal joint smaller in the male.

Xylophilus piceus. Hind femora in male armed near the tips with a large triangular tooth.

Notes on some Species of Geometridae, No. 2.

(Geometrinæ.)

By Geo. D. Hulst.

Geometra rectaria Grt. (Can. Ent. IX, 157, 1877.)

This seems to be a good species, and is found in some abundance in Central Texas and more rarely in Arizona and California. It is in some respects intermediate between *G. iridaria* Guen. and *G. illustraria* Hulst and may yet be found to grade into both.

Aplodes latiaria Pack. (5th Rept. Peab. Acad. p. 74, 1873.)

Prof. Lintner has kindly loaned me the type of this species for examination. I am unable to separate it from *A. mimosaria* (Guen, Phal. I, p. 377, 1852) except as a varietal form. The only material point of difference noted by Dr. Packard is that there is no inner white line on the hind wings. But on the specimen marked by him as "Type", the inner line is clearly indicated though very faint. In my observation there is in specimens of *A. mimosaria* every gradation from the distinct inner line to the form with the line obsolete. The name may be retained as a

varietal name for the latter form. There is also much variation in the general color of *A. mimosaria*, which ranges from sea-green to dull white, very faintly tinged with green.

Aplodes approximaria Pack. (5th Rept. Peab. Acad. p. 73, 1873.)

In this as in the preceding species, notwithstanding the statement of Dr. Packard to the contrary, the inner line on the hind wings is clearly indicated in the typical specimen. Mr. Graef has the only other specimen of which I have knowledge, but it is likely in other collections under the name of *A. mimosaria* Guen. The specimens I have seen of *mimosaria* vary very much in the distance between the cross lines; and though I have seen no connecting links with *A. approximaria*, they will probably sooner or later be found, and *A. approximaria* will be proved a variety only. Till that time it must be considered a good species.

Aplodes undinaria Strecker (Rept. Surv. Dept. Mo. p. 1862, 1878.)

This is a synonym of *Chlorosea bistriaria* Pack. (Geom. Moths, p. 378, pl. 13, fig. 55.)

Aplodes junctolinearia Graef. (Brook. Bull. III, 87.)

This beautiful insect is unique in the style of its markings and is consequently one of the most interesting of the sub-family.

Aplodes (*Chlorosea*) **albaria** Grt. (Can. Ent. XV, 126.)

This species is very close to *A. viridicaria*, Hulst (Brookl. Bull. III, p. 41). The hind wings are nearly pure white, but in this it connects by gradations with the very light green tinted wings of *A. viridicaria*. There are, so far as I can see, but two points of difference between the two insects. 1st, in *A. viridicaria* the white lines on the fore wings are considerably wider apart at the costa than at the inner edge; in *A. albaria* they are parallel all across the wings; in both the outer line is parallel with the outer margin. These are the type forms, but in the series of specimens I have the two forms connected. 2nd, in *A. viridicaria* the lines of the hind wings approach each other inwardly, which is not the case in the typical *A. albaria*. But in this, in my series of specimens, there are connecting examples. *A. albaria* seems to be the more prevalent form in Arizona. My present opinion based upon an examination of 8 specimens, is, that *A. albaria* is properly catalogued as a variety of *A. viridicaria*.

Geometra inclusaria, Walk. (List Brit. Mus. Geom. p. 508, 1861.)

I have a number of specimens from Florida which seem exactly to agree with the description of the above species as given by Mr. Walker. I have in my possession no authenticated specimen of *A. rubrolinearia* Pack. (5th Rept. Peab. Acad. p. 74, 1873), but from the description I

feel pretty certain it is the same as the species of Walker. The insect is an Aplodes.

Synchlora rubivoraria, Riley, (1st Report Ins. Mo. p. 239, pl. 2, f. 25, 1869) (*albolineata* Pack., 5th Report Peab. Acad. p. 75, 1873; *gracilaria* Pack., 5th Report Peab. Acad. p. 77, 1873), is a synonym of *Synchlora* (*Aplodes*) *glaucaria*, Guen. Phal. I, 377, 1857.

Synchlora tricoloraria, Pack. (Proc. Bost. Soc. Nat. Hist. XVI, p. 30, 1874) is a synonym of *Synchlora liquoraria*, Guen. (Phal. I, p. 375, 1857).

Chlorosea perviridaria, Pack. (Geom. Moths, p. 379, pl. 10, f. 82, 1876), is a synonym of *Chlorosea fasciolaria*, Guen. (Phal. I, p. 351, 1857).

Eucrostis zelleraria, Pack. (Geom. Moths, p. 370, pl. 10, f. 76), is a synonym of *Eucrostis phyllinaria*, Zell. (Verh. Zoo. Bot. Ges. Wien, p. 479, 1872).

Some species of Geometrinæ I have not been able to identify from their descriptions. It is however likely that *Geometra mimicata*, Walk. (List. Brit. Mus. Suppl., p. 1601, 1866), is a synonym of *Aplodes mimosaria* Guen., and both these may be the same as *G. ærata* Fab.; that *Thallasodes deprivata*, Walk. (List Brit. Mus. Geom., p. 1559, 1862), *Nemoria indiscriminata*, Walk. (l.c., p. 1556), and *N. densaria* Walk. (l.c. p. 1559), are variations of *N. chloroleucaria*, Guen. (Phal. I, p. 351, 1857); that *Eucrostis oporaria*, Zell. (Verh. Zoo. Bot. Ges. Wien, p. 481, 1872), may be a variation of *Nemoria pistaciata*, Guen. (Phal. I, p. 348. 1857); and that *Geometra euchloraria*, Ab. & Guen. (Phal. I, p. 355. 1857) is likely either *Nemorea subcroceata*, Walk. (List Brit. Mus. Geom. p. 1557, 1862), or *N. gratata* Pack. (Geom. Moths, p. 373, pl. 10, f. 79, 1876.)

I speak of these as probabilities, not so much for the purpose of giving my personal opinion based on a study of the literature, as for the purpose of exciting interest in some Entomologist making a visit to Europe and leading him to take specimens of these insects and others, that comparison may be made with the specimens in the British Museum, and with Guenee's types, which still exist in the possession of Mr. Overthür of Rennes, France. I think it probable that Zeller's types as yet undetermined, may be found in the collection of Lord Walsingham Merton Hall, Thetford, England. Any one visiting Europe could easily make needed comparisons and in a short time we could have the bulk of our Lepidoptera finally determined. The visits of Grote, Packard and Fernald bore in this line a wonderful deal of excellent fruit.

It may not be too much out of place here to add a note which affects one of our *Ennominae*, concerning the species of which subfamily I have already (Ent. Amer. I, pp. 46—49) given some brief notes. Some time since, I saw, by the kindness of Mr. John B. Smith of the National

Museum, the type of *Stenaspilates meskearia*, Pack. (Geom. Moths, p. 213, pl. 13, f. 50, 1876). I was very much surprised to find it to be the insect afterwards called *Azelina arizonaria*, Hy. Edw. (Pap. II, p. 130, 1882). Without being ready to give any positive opinion, I may yet say it seems to me, the insect is better catalogued for the present under *Azelina* as *Azelina meskearia*, Pack. Packard's type is from Texas, and is somewhat more olivaceous than the type of Mr. Edwards; but allowing *A. albomacularia*, Hy. Edw., to stand as a variety, there is hardly enough distinction between it and *A. meskearia* to allow another variety between them.

Two New Varieties of Noctuids.

By A. W. Putman-Cramer.

Raphia frater var. **coloradensis.**

♀ expands from 38 to 40 mm. Ground color of primaries yellowish white, more or less covered with black scales; *t.a* and *t.p.* lines strongly marked; black dash between reniform and costa; lower third of median space and all of basal space covered with black scales. Secondaries white, more or less covered with black scales. Male expands from 34–38 mm. Ground color of primaries yellowish white, more or less covered with black scales; *t. p.* line faintly marked, black dash between reniform and costa. Basal space thickly covered with black scales; lower half of median space entirely black. Secondaries like those of the females. In both ♂ and ♀ the prothorax is grey, and the thorax nearly white.

Described from 3 ♂ and 4 ♀, taken by D. Bruce in Colorado.

Calocampa cineritia var. **thoracica.**

Expands 45 mm. Prothorax and abdomen bright fulvous, thorax brownish grey. Ground color of primaries grey, of secondaries fulvous grey with light fulvous fringe. Basal lines well marked, wavy rather than sinuous, costa slightly fulvous. Stigma and reniform close together giving the appearance of a *p* on the left wing, and a *q* on the right one, the legs of which are curved outward.

From reniform a narrow yellowish dash runs subapically, having a round brown spot at its starting point in the reniform and a slightly sinuous black dash at its lower edge near the margin.

Under side of both wings fulvous grey. Stigma on secondaries faintly marked. Outer edges of both wings paler than body of wings.

Differs from the type in the color of the thorax, the wavy basal lines and the lighter colored fringe of primaries.

Described from a number of specimens taken in New Hampshire, by C. F. Goodhue.

Proceedings of the Entomological Club of the A. A. A. S.

The Club met under the rules and pursuant to notice at the rooms of the Buffalo Society of Natural History on Main Street at 3 o'clock P. M. on Tuesday, August 17, 1886. 14 persons being present.

The President, Prof. J. A. Lintner of Albany, called the meeting to order.

The Secretary, Mr. John B. Smith of Washington, being unable to attend, Mr. E. Baynes Reed of London, Canada, was appointed Secretary pro temp.

As the minutes of the previous meeting at Ann Arbor had been printed in "ENTOMOLOGICA AMERICANA", the reading thereof was on motion dispensed with.

Prof. Lintner in taking the chair expressed his pleasure at meeting again so many brethren of the club; he alluded briefly to the absence of some who were usually present at these meetings and referred especially to Prof. C. V. Riley who had gone to Europe for the benefit of his health. He also paid a high tribute to the contributions to Entomology, especially to the Lepidoptera, that had emanated from the rooms in which they were now assembled.

The President then delivered his Annual Address.

ANNUAL ADDRESS OF THE PRESIDENT

of the Entomological Club of the A.A.A.S.

at the Buffalo Meeting, Aug. 17, 1886.

GENTLEMEN: I do not know that I can better discharge the duty devolving upon me, of the presentation of an address on this occasion, than in reference to some of the evidences of the continued progress made in our department of science as shown in publications which have appeared since our last meeting. Little that I shall refer to, may be new to most of those present, yet a retrospect of labor satisfactorily performed and successfully prosecuted, is always agreeable to those who have had part therein, while it may prove of interest and of value to those who are not present with us, or active members of our corps, or who may not have access to our current literature.

Each of the several orders of Insects have been advanced through valuable studies and publications. While in some of the orders, the publications have been but few, yet it is gratifying to know that collections are being made in them and studies prosecuted, of which we may look for the results ere long.

In the *HYMENOPTERA* a *Monograph of the Chrysididæ* has been

published by Mr. S. F. Aaron, containing diagnostic descriptions of genera and species. Seventy-four species are described, over one-half of which are new to science. Nearly all are contained in the collections of the American Entomological Society, of which Mr. Aaron is the curator. A list of the more important writings on the *Chrysididæ* is appended, and the paper is illustrated in five plates (Transactions of the American Entomological Society, xii, 1885, pp. 209–248).

Mr. Wm. H. Ashmead has given a *Biographical and Synonymical Catalogue of the North American Cynipidæ*, containing 172 species, together with a list of the trees and plants upon which they occur. It appears that these insects are so nearly confined to oaks (of the twenty species enumerated), that only 13 species have other food-plants (Id. ib., pp. 291–304).

From the same author we also have *Studies on North American Chalcididæ*, giving descriptions of 55 new species from Florida and notes upon others (Month. Proc. Am. Ent. Soc. for Dec. 1885, pp. X–XIX; Trans. A. E. S., xiii, pp. 125–135).

Mr. L. O. Howard, of the Entomological Division of the U. S. Department of Agriculture, who for several years past has been engaged in the study of the interesting and serviceable family of the *Chalcididæ*, is contributing to Entomologica Americana, a generic synopsis of the family, which he has divided into twenty subfamilies. The European genera have been combined with our own, as many of them will doubtless be hereafter detected in this country (Ent. Amer. i, pp. 197–199, 215–219, ii, 33–39, 97–101). A list of the North American species by Mr. Howard, may be found in Bulletin V of the Division of Entomology, which also embraced the first of a series of papers descriptive of the *Chalcididæ* in the collection of the Department, most of which were undescribed.

Contributions to the knowledge of our Hymenoptera, have also been made by Messrs. G. J. Bowles (Canadian Entomologist, xvii, p. 231), J. A. Guignard (id. xviii, p. 68), Wm. H. Harrington (id., pp. 30, 38, 45; Trans. No. 6 of Ottowa Field Naturalist's Club), G. W. Taylor (Canad. Ent., xviii, p. 250), and I. W. Fyles (ib., p. 38).

We are greatly pleased to learn that Mr. Ezra T. Cresson, to whom we are more largely indebted than to any other person for the knowledge of our North American Hymenoptera, is engaged upon a synopsis of the order, and that such progress has been made in its preparation that its publication may be expected before many months.

In the *LEPIDOPTERA* a volume has been given to the public the present year, which we hope will be followed by others of the kind, in other of the orders, that greatly needed wants may be met.

The Butterflies of the Eastern United States, for the use of classes in Zoology and private students, by Prof. G. H. French, of the Southern Illinois Normal University, will enable the intelligent student, by the aid of synoptic tables, descriptions and figures, to name almost any of the species that occur within the United States, east of Nebraska, Kansas and Texas. Two hundred species are described, illustrated in 93 figures, and where known, the earlier stages are also given.

A similar work, devoted to a smaller group, is the *Sphingidæ of New England*, by Prof. C. H. Fernald—a pamphlet of 85 pages and 6 plates, in which the forty-two species known to occur in the Eastern States are described and a few of them figured.

A feature in both of the above publications which deserves special commendation, is the accentuation of the names of the species. The care that has been bestowed upon the preparations of these lists, entitle them to acceptance and adoption, and we hope will ensure us some degree of uniformity in pronounciation, hereafter.

Prof. Fernald and Mr Jno. B. Smith have contributed notes upon *Some of the genera of our Sphingidæ* (Entomologica Americana ii, p. 2).

Mr. Smith has continued his *Introduction to a Classification of the North American Lepidoptera* in a fourth paper, devoted to the Sphingidæ (id., i, p 81—87), and has also given a more detailed account, with figures, of the scent-organs in some Bombycid Moths, than we have hitherto had (id. ii, p. 79).

The careful Life-histories of our Butterflies have been continued by Mr. W. H. Edwards (Canad. Ent., xvii, pp. 155, 181, 245), and also his Descriptions of New Species, from the Pacific Slope (Id. p. 61).

The Rev. G. D. Hulst has published during the last month, *Descriptions of New Pyralidæ*, embracing such species as are not named in the American collections and are unknown to those who have made special study of the family. Much the larger number of the species described (89 in all) are from the western portion of the United States (Trans. Amer. Ent. Soc. xiii, July 1866, pp. 145—168). Mr. Hulst has also published two papers upon the *Geometridæ* in which several new species are described, viz., *New Species and Varieties of Geometridæ* (Ent. Amer., i, pp, 201—208) and *Notes upon various Species of the Ennominæ* (id. ii, pp. 47—52).

Descriptions of new species of Lepidoptera have also been published by Mr. Henry Edward (Ent. Amer., i, p. 128, ii, p. 8), Mr. J. Elwyn Bates (Can. Ent., xviii, 74, 94), Mr. Ph. Fischer (Id., xvii, p. 133), Mr. B. Neumoegen (Ent. Amer., p. 192), and Mr. R. H. Stretch (Id., p. 102).

In the Proceedings of the Natural Science Association of Staten Island, for March 1886, Mr. Davis has recorded sixty species of butterflies as found upon Staten Island, naming the recent additions to a former list.

Other contributions to the Lepidoptera have been made by Messrs. Beuttenmüller, Bates, Clark, Fischer, Fletcher, French, Goodhue, Grote, Hamilton, Harrington, Kellicott, Moeschler, Smith, Stretch, Tepper, and Mrs. C. H. Fernald and Miss Murtfeldt.

It is gratifying intelligence that the two volumes of the *Butterflies of North America*, for which we are indebted to Mr. W. H. Edwards, is to be followed by a third, work upon which has been commenced. As the volumes already issued have furnished the American student with a better series of life-histories of butterflies than have ever been published elsewhere, while enriched with illustriations which in beauty and accuracy have never been surpassed, it is to be regretted that their author should be compelled to find the reward for his years of untiring labor in the honor that they bring him, and not in a pecuniary return. A merited tribute to the high character of this work, may be found in Science for October 9, 1885 (p. 307).

The *Butterflies of New England*, which has been under the pen and pencil of Mr. S. H. Scudder for several years, and which has been so long awaited by Entomologists, is, we learn, rapidly approaching completion. Having had the privilege of examination of several of the plates which are being printed at the well-known house of Sinclair & Sons, Philadelphia, by the chromo-lithographic process, I can only say of them, that they are marvels of faithfulness and beauty, hardly to be distinguished from hand-coloring. They certainly mark an advance in the application of this art to insect illustration that has never before been equaled in this country or in Europe.

A *Hand book of all the Lepidoptera described as belonging to the North American Fauna North of Mexico*, giving brief descriptions of all the species known, to be illustrated with wood-cuts and lithographic plates, under the editorship of Mr. Henry Edwards of New York, has been announced. It will be issued in parts, by S. E. Cassino, as stated in a circular distributed, and will be commenced as soon as a sufficient number of subscribers can be obtained.

Mr. R. H. Stretch is engaged on a *Monograph of the Zygaenidæ, Lithosiidæ and Arctiidæ of North America*, in which it is intended to collate all the literature relating to these families, and to illustrate all the species. About 350 figures have already been drawn for the work.

DIPTERA.—We are unable to report much progress upon this order during the year.

Dr. Williston has completed his series of three papers on the *Classification of the North American Diptera* in the families *Xylophagidae*, *Stratiomyidae*, *Tabanidae*, *Leptidae* and *Syrphidae*, published in the Bulletin of the Brooklyn Entomological Society (vii, p. 129) and in Entomologica Americana (i, pp. 10, 114, 152), In these papers some new species are described, synoptic tables of the genera and diagnoses of the tribes and families given, and structural features illustrated.

Dr. Williston has also published *Notes and Des riptions of North American Xylophagidae and Stratiomyidae* (Can. Ent. xviii, p. 121), in which eleven species are described as new.

Dr. Hagen has written of the *Hessian Fly in Italy*, recording its notice in that country (Ib., p. 129). He has also collated some facts relating to the food of *Scenopinus larvae*, leading him to offer the suggestion that *S. pallipes* found beneath carpets, may be carnivorous (Id., xviii, p. 73). Some observations of my own which are stated in the 2d Report on the Insects of New York, give additional reason for believing that this remarkable larva, feared as carpet-feeder, may prey upon the larva of the clothes-moth.

The volume last referred to, contains also notices of an unknown larva feeding upon a fungus occuring on quince, the emasculating bot-fly (*Cuterabra emasculator*), *Bibio albipennis*, *Microdon globosus*, and *Trypeta pomonella*.

As addenda to the Scenopinus article by Dr. Hagen, Baron Osten-Sacken has contributed to the Entomologist's Monthly Magazine for the present month of August (vol. xxiii, p. 51—52) *Notes toward the Life-history of Scenopinus fenestralis*, in which the literature of the species is more fully developed, and the conclusion drawn therefrom that the larva is undoubtedly carnivorous; and that it frequents fungi, hair-mattrasses, carpets, swallows nests, decaying wood, animal dejections, etc., not for the sake of the animal remains or the vegetable matter, but for the larvæ or the pupæ of the moths that live in them.

Dr. Hagen also recorded the collection in Harvard College Laboratory, of what is probably an addition to the small number of known marine insects, in *Coleopa frigida*, Fallen, raised from sea-weeds. Its earlier stages are unknown, and the opportunity is taken to call attention to the absence of any collection of our knowledge of the earlier stages of the Diptera.

In a brief note from the same author to Entomologica Americana (i, p. 229), the idea is advanced that in *Cecidomyia tubicola*, O.-Sacken, the larval breast-bone is a spinning organ, and homologous with the labium.

Mr. D. W. Coquillet has monographed the Lomatina of North America of the *Bombylidae*, consisting of four genera, indicating one as new, and describing five new species (Can. Ent., xviii, p. 81).

COLEOPTERA. — Dr. G. H. Horn has continued to lay us under obligations for his valuable contributions to Coleopterology, in descriptive, classificatory, bibliographical and critical papers, in the pages of the Transaction of the American Entomological Society, the Canadian Entomologist, and Entomologica Americana. Their titles are too numerous to permit their citation in the present paper.

Lieut. Casey has published *New Genera and Species of Californian Coleoptera* [Extra Bulletin, California Academy of Science, vol. I], and a *Revision of the Californian Species of Litho:haris* [Bull., No. 5, Id.].

Mr. Frederick Blanchard has given a careful paper *On the species of Canthon and Phanaeus of the United States*, with synoptic tables of species, bibliography, and notes on some other genera [Trans. Amer. Ent. Soc., xii, pp. 163—172].

Mr. Charles W. Leng, is contributing to Entomologica Americana, *Synopses of Cerambycidae*, accompanied with illustriations [vol. I, pp. 28—35, 130—136; II, p. 27—32, 60—63, 81—83, 102—103].

Other contributions to the order, which have come under my notice, are from Messrs. F. B. Caulfield, F. Clarkson, John Hamilton, S. Henshaw, A. W. Jones, Warren Knaus, C. W. Leng, A. L. Packard, E. A. Schwarz, J. B. Smith and C. W. Strumberg.

In Entomologica Americana for July and August 1886 is a *Record of some Contributions to the Literature of North American Beetles published in* 1885, by Samuel Henshaw, which will be found very convenient for reference, and for which its compiler is entitled to sincere thanks.

The most generally acceptable contribution to this order made during the year, has been the *List of the Coleoptera of North America, North of Mexico*, by Samuel Henshaw, in which we are given the recent classification of Drs. Leconte and Horn, the large number of species described during the preceding twelve years, together with many important synonymical corrections. Annual supplements to the List are promised by the author. The labor involved in the preparation of a work of this nature, is so great, that each successive contribution of the kind, if as meritorious as the one under notice, marks an epoch in the literature of the order.

In the *HEMIPTERA* we have had the gratification of having placed in our hands, our first Check-List. It presents a classification which has been so long needed by the student, of the Heteroptera, and the names of 1448 species. A debt of gratitude is due to Mr. Uhler for

its preparation, in consideration of the facility of study that it will afford, and the incentive to its prosecution.

We have the promise that a similar List of the Homoptera will follow as soon as time can be found for its preparation.

The chapter on Hemiptera, in the Standard Natural History recently published by S. E. Casino & Co., of 92 pages royal octave, is also from Mr. Uhler, and has been, I believe, generally received as advancing our knowledge of an order which has been much neglected in this country.

The Fourteenth Report on the Insects of Illinois, by Prof. S. A. Forbes, State Entomologist, treats of several Hemipterous Insects, chiefly in their economic relations.

In the Report of the Entomologist of the U.S. Department of Agriculture for 1885, Prof. Riley has presented a careful study of the two broods of the Periodical Cicada, *Cicada septendecim* — the seventeen-year (*septendecim*) and the thirteen-year race (*tredecim*), which appeared in 1885 over a large extent of the country, and came together in Southern Illinois and Northern Georgia. There is also a summary of distribution and future appearance of all the broods (22 in number) known to occur in the United States; also a record of experiments made in transferring the eggs of the Northern and Southern races of the insect from one portion of the country to the other, as a test of the influence of climate upon the developmental period.

In the 14th Annual Report of the Geological and Natural History Survey of Minnesota, Mr. O. W. Oesttund has contributed a *List of the Aphididæ of Minnesota*, in which seventy-one species are recorded, of which twenty-four species are described as new, and two new genera named.

Among other contributors to the order, are Mr. Wm. Ashmead, Prof. E. W. Claypole, and Mr. John J. Jack.

In the *NEUROPTERA*, Dr. Hagen has contributed the European literature of the *Hemerobius dipterus*, of which twenty examples are in collections in Europe, and four, so far as known taken in this country, referring to this species Dr. Fitch's type of *H. delicatulus* (Entomologica Americana, ii, p. 21).

Mr. J. A. Moffat has narrated some habits of a Myrmeleon larva (Canad. Entom., xviii, p. 76).

Two elaborate papers from Dr. Hagen are additions of much importance to the literature of the Pseudoneuroptera. The first is a *Monograph of the Earlier Stages of Odonata*, (in 43 pages) in which 48 species in the subfamily of Gomphina and Cordulegastrina are described (Trans. Amer. Entomol. Soc. xii, pp. 249—291). The second is a *Monograph of the Embidina*, and is apparently one of the most careful and pains-

taking of the erudite author's publications. Not only is each one of the seventeen known species minutely described (six pages in some instances are devoted to a single species) but the history of the family is fully presented together with an extended discussion of its characters with reference to its assignment to its proper systematic position, which is held by the writer to be near the *Termitidæ* (Canad. Entom. xvii, 1885. Aug., Sept., Oct. and Nov.).

Of writings upon the *ORTHOPTERA*, I find only a *List of the Orthoptera of Kansas*, by Lawrence Bruner and a note on the habits of Œcanthus, by E. W. Allis.

A resume of our knowledge of Fossil Insects has been published by Mr. Scudder, in a volume of 113 pages, entitled *Systematische Uebersicht der Fossilen Myriapoden, Arachnoideen und Insekten.* It presents an excellent and comprehensive view of our knowledge of these interesting forms, under a systematic arrangement with definition of groups and abundant illustration. It is understood that it will be republished in this country.

Mr. Scudder is at present engaged upon an extensive work as it will necessarily be, descriptive of the fossil insects taken from the wonderfully prolific locality, the Tertiary Lake Basin at Florissant, in Colorado—more abundant in insect remains than any other known locality in the world. It is thought that the first part of this work will be ready for publication the coming year.

The contributions to which we have refered in the several orders have been descriptive, classificatory, historical, biological, histological, anatomical and biographical. It would perhaps have been more satisfactory if these several departments of study could have been separately reviewed, but the time has not been found for such presentation.

In consideration of the practical importance of economic investigations, will you permit me to direct your attention to some of the work done in this direction, which has been given to us during the year:

The *Fourteenth Report on the Noxious and Beneficial Insects of Illinois*, by the State Entomologist, Prof. S. A. Forbes, is devoted to the consideration of various insects infesting corn, wheat, grass, clover, the maple, the elm, garden crops and orchards. A valuable appendix to this report is a general index to the first twelve Illinois reports—of the species of insects alphabetically and systematically arranged, their food-plants, and the remedies treated of.

The *Report of the Entomologist of the U.S. Department of Agriculture, Prof. C. V. Riley*, for the year 1885, presents us with the latest information upon progress in Silk Culture in the United States, an extended notice of *Cicada septendecim*, and notices of recent injuries by five

other species of insects. Addenda to this report are the following: Report on the Locusts of the San Joaquin Valley, Cal., by D. W. Coquillet; Report on the abundance of the Rocky Mountain Locust, in 1885, by Lawrence Bruner; Notes on Locusts at and about Folsom, Cal., by Albert Koebele; Insects infesting Fall wheat, by F. M. Webster; 3rd Report on the Cause of the Destruction of the Evergreen and other Forest trees in Northern New England, by A. S. Packard (the lepidopterous insects); and Report on Experiments in Apiculture, by N. W. McLain.

The *Second Report on the Injurious and other Insects of New York*, by the State Entomologist (279 pages), embraces notes of various insect attacks; remedies and preventives for insect attacks; miscellaneous notes; and notices of Lepidoptera, Coleoptera, Hymenoptera, Orthoptera and Neuroptera. In the Appendix is a list, with notes, of the miscellaneous publications of the Entomologist for the years 1882 and 1883, and republication of the rare paper of Dr. Fitch on the *Winter Insects of Eastern New York*.

The *Report of the Entomologist to the Department of Agriculture of the Dominion of Canada*, by James Fletcher, (56 pages), is occupied with notices of the principal insect attacks during the year 1885, upon cereals, hay and clover, vegetables, fruits, and forest and shade trees.

A *Report upon Orange Insects* (227 pages) presents the investigations of Mr. H. G. Hubbard, a special agent of the Entomological Division of the U.S. Department of Agriculture, made in Florida, during the years 1881–5. The entire insect fauna of the orange, so far as known, is given, and the species discussed, together with the remedies and preventives which have been found to be the most effective in their destruction. The orange-rust is also considered, and is regarded as a condition of the fruit resulting from the attack of the rust-mite, *Typhlodomus oleivorus* Ashmead.

Bulletin No. 11, of the U.S. Department of Agriculture, Division of Entomology, (34 pages), is devoted to Experiments on various insecticide substances, chiefly upon insects affecting garden-crops, made under the direction of the Entomologist, by F. M. Webster, H. Osborn, and Thomas Bennett.

Bulletin No. 9, of the same Division, just issued, is entitled, *The Mulberry Silk-worm; being a Manual of Instructions in Silk-Culture, by C. V. Riley, M.A., Ph.D.* It is a revised and enlarged edition of Special Report No. 4 of the Division, which had been exhausted. It contains 62 pages, a glossary of terms used, 29 figures, two plates, in chromo-lithograph, showing silk-worms affected by Pebrine and flacherie, and the pebrine corpuscles, after Pasteur, and an index.

Bulletin No. 12 of the same Division, also just issued, is entitled *Miscellaneous Notes on the Work of the Division of Entomology for Season of* 1885, *prepared by the Entomologist.* It is a pamphlet of 46 pages and 1 plate, and contains a Report on the production and manufacture of Buhach, by D. W. Coquillet, which is full and of much value; additions to the 3rd Report on the causes of the destruction of the evergreen and other forests in Northern New England, by A. S. Packard; The Periodical Cicada in Southwestern Indiana, by Amos K. Butler; and Notes of the year, of various insects.

The *Fourth Report of the U. S. Entomological Commission, on the Cotton Worm,* by Prof. C. V. Riley, is a volume of 546 pages, carefully indexed, and illustrated by 64 plates. Of these, 48 plates and 137 pages are devoted to the mechanical devices for the destruction of the cotton worm. The three chapters treating of the remedies and preventives employed in coping with the insect (70 pages), are especially valuable to the agriculturist, as many of them would be equally available against other insect attacks.

The four large octavo volumes of the Entomological Commission, and its seven Bulletins, of nearly 3000 pages in the aggregate, 150 plates, several hundred of wood-cuts, and a number of maps, may confidently be appealed to in justification of the action of the General Government, if its wisdom be questioned, in authorizing and providing for the work of the Commission now brought to a close in its final publication.

Prof. Riley, in his *Presidential Address before the Entomological Society of Washington,* as published in the Proceedings of the Society, has referred to some of the insect attacks which had recently come under his observation.

An *Address upon Horticultural Entomology* (23 pages), by Prof. F. M. Webster, before the Indiana Horticultural Society, very clearly presents the importance of insect studies to the horticulturist, who may not to any great extent ward off insect attack by the means successfully reserted to by the agriculturist—by rotation of crops. It also gives comprehensive notice of several of the more injurious insects with which the horticulturist must contend.

The same author has also issued a carefully prepared illustrated paper, of 36 pages, on the *Insects affecting the Corn Crop,* extracted from the Indiana Agricultural Report for 1885. Of the fifty species of corn insects noticed, several are accompanied with useful bibliographical lists.

Insects Injurious to the Apple, is the title of a paper, by Prof. B. F. Koons, extracted from the Report of the Connecticut Board of Agriculture, for 1885. The claims for the study of entomology are well presented in it.

A paper upon *Cut-Worms*, read before the New York State Agricultural Society (pp. 25, figs. 20), and one entitled *Some Injurious Insects of Massachusetts*, read before the Massachusetts State Board of Agriculture, by the State Entomologist of New York, have been published in the Annual Reports of the Societies named, and also as separates.

The Fourth Report of the New York Agricultural Experiment Station, narrates (pp. 216—223) experiments made at the Station with insecticides upon some of our more injurious insect pests; and contains also, a notice of a very interesting fungus attack upon *Phytonomus punctatus* (pp. 258—262), inasmuch as it is believed to have been communicated through the agency of a fertilizer employed. The fungus is named by Prof. Arthur, Botanist of the Station, *Entomophthora Phytonomi.*

The Fourth Report of the Ohio Agricultural Experiment Station, for 1885, devotes 6 pages to experiments with insecticides, and the best method for their application.

An Experiment in Silk Culture, by Prof. T. J. Burrill, made under direction of the Illinois University, is published in the Proceedings of the 6th Meeting of the Society for the promotion of Agricultural Science. The experiment terminated in the study of a contagious disease that broke out in the larvæ that were being reared, which was believed to be identical with the *flacherie* of the silk worm in France, observed by Pasteur. The disease had never been previously recorded as existing in this country, but is now thought to have long prevailed among our native Lepidoptera, and to have been the cause of a recent epidemic in the *Pieris rapæ* larvæ. The causes that may have led to the outbreak of disease among the silk-worms attempted to be reared, are considered in the paper.

In the same publication, is an abstract of a paper by Prof. C. V. Riley, on *Grasshopper Injury*. A periodicity in wide-spread locust injuries averaging about every eleven years is accepted. It is claimed to be possible to predict the degree of destructiveness. Thus, increasing injury for the years 1886 and 1887 may be expected should the weather favor; but even under the most favoring conditions, these injuries can never again be so wide spread, it is asserted, as between 1874 and 1877.

Prof. S. A. Forbes, who has for some time, been paying special attention the diseases of insects with a view of their propogation for the destruction of injurious species, has published in a Bulletin of the Illinois State Laboratory of Natural History (vol. ii, pp. 257—321) an elaborate paper entitled *Studies on the Contagious Diseases of Insects.* In it he dis-

cusses *flacherie* in the cabbage-worm, *Pieris rapæ*, describing the disease minutely, its characteristic bacteria, the evidence of its contagious nature and of the ability of conveying it by an artificial culture of the Micrococcus. In the same pains-taking manner, jaundice, found associated with *flacherie* in the silk-worm, by Prof. Burrill, is also discussed. *Flacherie* in *Datana angusii* is described, with its characteristic bacteria, their artificial cultures, and contagious nature. The paper concludes with a notice of the aid rendered by *muscardine* in arresting wide-spread desolation in forests and orchards, in Southern Illinois, in 1883, caused by a remarkable prevalence of the forest tent caterpillar, *Clisiocampa sylvatica*.

The Insects of Betula in North America, by Anna Katherina Dimmock, of Cambridge, Mass., contained in Psyche, iv, pp. 239—243, 271—286, is an admirable compilation, and may justly serve as a model for similar lists. It is not a simple record of the 107 species, noticed as feeding on *Betula*, but valuable notes are given upon each insect—of development, habits, history, etc., the other plants upon which it is known to feed, with references to authority and publication. Where the bibliography is so extensive and of such importance as to justify it, an entire page, of small type, is devoted to a single species. It is to be hoped that this is but the first of a series of similar publications by the author.

A published abstract of a paper read by Mr. Amos W. Butler, before the American Association for the Advancement of Science at its last meeting, on *The Periodical Cicada in Southeastern Indiana*, gives the time and duration of its visitation, the mode of oviposition, abundance of the var. *cassini* Fisher, in a distinct territory, the sounds produced, prevalence of a fungus attack, their destructions by mammals, birds and fishes, and the comparatively slight damage resulting from the visitation. The paper affords evidence of well-trained habits of observation in the author.*

Dr. Hagen has communicated an interesting observation made by him of the destruction of living trees, of the red maple, *Acer rubrum*, by white ants, in Cambridge, Mass. (Canad. Ent., xvii, p. 134).

Mr. Frederick Clarkson has found, that under some circumstances at least, the development of the oak-pruner. *Elaphidion villosum*, is different form that ascribed to it by Drs. Harris and Fitch, in that the insect may mature within its burrow as early as in the month of November (Id., p. 188).

* The paper has been published in full, during the present month, in Bull. No. 2 of the U. S. Dept. of Agriculture,—Division of Entomology, pp. 24 to 31.

Mr. John J. Jack reports serious injury to a crop of beans, through an attack of an Anthomyian fly, *Anthomyia angustifrons*, the larva of which attacked and destroyed the plants before they reached the surface of the ground (Canad. Entom., xvii, 1886, p. 22).*

This form of Anthomyian attack, akin to that of the seed-corn maggot, *Anthomyia zeæ*, may afford a solution of the frequent eating out of the interior of melon and some other of the larger seeds beneath the ground, by hitherto unknown enemies, which has been brought to my notice.

Prof. Riley has made an interesting communication to Science (vol. vii, p. 394), to the effect that *Feniseca tarquinius*, one of our rarer butterflies, has been found to be carnivorous in its larval stage—the only known instance of a carnivorous butterfly, and that its food consists of plant-lice, especially of the gall-making and leaf-curling species of *Pemphiginæ*.

This publication solved what had been a mystery to me. A piece of a branch of some tree, apparently an alder, was sent to me in October last, thickly covered with the flocculent bodies of some woolly aphis, probably a *Schizoneura*. It was left in the box in which received, awaiting further notice. Upon casually opening the box early in April, to my great surprise, a newly emerged and perfect *Feniseca tarquinius* was found therein, and the short, stout chrysalis case from which it had escaped, and an undeveloped chrysalis, each suspended by its cremaster from the sides of the box. How and where the larva conceals itself during its growth, is an interesting inquiry.

Our leading Agricultural Journals are the media of no inconsiderable amount of information of the means for controlling insect depredations. They furnish convenient channels through which inquiry may be made from any portion of the Union of any unrecognized form of attack, and an intelligent reply elicited.

Professors Riley and Cook are frequent contributors to the columns of the *Rural New Yorker*.

The *Prairie Farmer* maintains an Entomological Department, averaging two columns weekly in extent, under the editorship of Clarence M. Weed.

The same department in the *Fruit Growers Journal*, of Cobden, Illinois, containing weekly contributions, is edited by Prof. G. H. French.

To the *American Agriculturist*, contributions are made and inquiries answered by Prof. Riley.

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* This occurence is subsequently noticed at greater length in Bull. No. 12, of the Division of Entomology, p. 38-39.

A communication made to Science (May 28, 1886, vii, pp. 481—3) by R. I. Jackson, records a New Museum Pest in *Lepisma domestica*. It had been discovered as very injurious to labels; and it is further believed to be the author of the injury often reported, to muslin curtains, silks, etc., commonly charged upon the carpet beetle, *Anthrenus scrophulariæ*, as such injuries are known to have resulted from species of Lepisma in other countries, as well as to books, maps, papers, etc.

The *Spirit of the Farm*, of Nashville, Tenn.. is publishing a series of entomological articles, by the entomological editor, Prof. E. W. Doran.

The *Pacific Rural Press* keeps its readers well informed of the active entomological work being prosecuted in California, in the struggle for the preservation of the fruits of the State from the onslaught of thus far an invincible army of scale-insects.

The *New England Homestead*, of Springfield, Mass., encourages the observation of insect habits and injury in diffusing much valuable information in this direction.

The *Country Gentleman* of Albany, N. Y., receives many inquiries of insect attacks, which are answered, often at considerable length, by the State Entomologist of New York.

In addition to the preceding notice of the publications of our entomologists, may I be permitted to refer to some studies of particular interest which have been giving us during the year outside of our country to which general attention may not have been drawn.

Recent studies of Forel, Kraepelin, Hauser and others, had placed almost beyond question, the location of the sense of smell in insects, in the antennæ. Later the study has again been taken up by Prof. V. Graber, of the University of Czernowitz, Austria, with results that serve to re-open the question, and invite to further investigation.

In a late number of the Comptes-Rendus of the Societe Entomologique de Belgique, his conclusion are summed up as follows:

1. The perception of odors is not confined to the antennæ, for ants and *Lucilia Cæsar* deprived of their antennæ, retained the perception.

2. The antennæ are perhaps more sensitive to odors than other parts of the body. *Silpha thoracica* deprived of its antennæ, was affected by some odors but not by some weaker ones.

3. The palpi may be more sensitive to odors than the antennæ, as will appears from some experiments made with *Gryllotalpa vulgaris*.

4. In a large series of experiments with a *Lucanus* which followed the odorous material employed, sometimes the palpi and sometimes the antennæ, were the more rapidly excited.

5. The perception of odors may also lie in the anal stylets, as shown

in a decapitated *Periplanata*. (This idea had been previously advanced by Dr. Packard. Amer. Nat. iv, 1870, p.).

6. Insects have no special organ of smell.

The studies of Ecner, communicated to the Vienna Academy in 1875, led to the rejection of the mosaic theory of vision in insects as necessarily attendant upon their compound eyes, and to its replacement by the theoretical deduction that they do not distinguish the form of objects, but that their vision consists mainly in the perception of movements and of colors. Their facetted eyes are not complete visual organs, but simple organs of orientation.

In a subsequent communication by Plateau to the Royal Academy of Belgium, he has presented the following conclusions drawn from studies of Diptera, Hymenoptera, Lepidoptera, Odonata and Coleoptera.

In diurnal insects with compound eyes, the simple eyes offer so little utility, that it is right to consider them as rudimentary organs.

Insects with compound eyes do not notice differences of form existing between two light orifices, and are deceived by an excess of luminous intensity as well as by the apparent excess of surface. In short, they do not distinguish the form of objects, or if they do, distinguish them very badly (Amer. Naturalist, xx, p. 69).

The structure of the halteres of Diptera has been studied by Mr. A. B. Lee, who finds them to embrace two distinct organs, one an auditory organ, and the other of problematical function, which may be olfactory (Entomologische Nachrichten, for August, 1885).

Sir John Lubbock records as an instance of remarkable longevity in ants, that two queens of *Formica fusca* had been kept alive by him within their nests for twelve years (Contemporary Review, for Nov., 1885).

Returning to our own country, unmistakable evidence of rapid progress in our science is to be found in the explorations by private individuals, institutions and government surveys, of almost every portion of our country for unknown species and the prompt study of the material obtained, by competent specialists.

Our lists of species are rapidly augmenting.

In a paper recently read by me, not yet published, on the *Present Status of Entomological Science in the United States*, I had occasion to state the number (as near as could be) of the described species of North American Insects, North of Mexico. As it contained some estimates made for the paper, it may be of interest to present the table at the present time.

Hymenoptera (Cresson's estimate)	Phytophaga	573	
	Entomophaga	2166	
	Prædores	1078	
	Anthophila	633	4,450
Lepidoptera; Butterflies (Edward's List, 1884),			614
Moths (Grote Check List, 1882),			3,184
Tineidæ (not included by Grote, Chamber's List, 1878),			779
Diptera (Osten-Sacken's estimate in 1878),			2,500
Coleoptera (Henshaw List of 1885),			9,507
Hemiptera-Homoptera (Uhler estimate),			1,200
Heteroptera (Uhler Check List, 1886),			1,448
Orthoptera (Scudder estimate),			450
Neuroptera, not estimated—perhaps			1,000
Giving a total of			25,132

Upon former occasions when it has been my privilege to address this Club officially, I have urged the importance of the study of the earlier stages of our insects upon its members and upon all students in entomology. I beg leave to repeat the recommendation in view of the value of such study in a scientific classification, and the necessity of it in economic investigation, for of but comparatively a small number of our insects are the earlier stages known, and of only a few do we possess full life-histories.

Although the Coleoptera have been the most thoroughly worked of any of the orders, yet it will surprise some of you to learn, as it did me, when I recently received the information from an eminent Coleopterist, of how small a proportion are the earlier stages known.

By permission of the writer, Mr. E. A. Schwarz, I give the communication addressed to me in reply to an inquiry made, in which the information above referred to is embodied. It is of so much interest and value, that it deserves publication:

"I have endeavored to keep track of the descriptions of Coleopterous larvæ from all countries. I herewith select at random a few of the larger families, and do not believe that the proportion of the known larvæ to the total number of species would be materially changed if I would go through all families. For the *Chrysomelidæ*, unfortunately, I cannot get at the figures without much trouble.

In *Carabidæ*, including the *Cicindelidæ*, there are described, in round numbers, the larvæ of 120 species representing 40 genera, out of a total of 9300 species.

In *Dytiscidæ* there are described 22 species representing 13 genera, out of a total of 950 species and 35 genera.

In *Hydrophilidæ*, there are described 30 species representing 14 genera, out of a total of 570 species and 30 genera.

In *Staphilinidæ* are described 75 species with 37 genera, out of a total of 4136 species and 270 genera.

In *Silphidæ* are described 25 species with 9 genera, out of 960 species.

In *Scarabæidæ*, are described 85 species in 40 genera, out of 6550 species.

In *Buprestidæ* are described 70 species in 20 genera, out of about 2700 species.

In *Elateridæ*, about 60 larvæ described out of a total of 3100 species.

In *Curculionidæ*, about 200 larvæ described in 65 genera, out of a total of 10150 species.

In *Cerambycidae*, about 150 species of larvæ described in about 70 genera, out of a total of 7600 species.

A summing up of the above shows that there are about 900 species of larva described, out of a total of 45,600 species, giving a proportion of 1 to 50. Since the publication of the Munich Catalogue, the description of new species has gone on with unabated activity, while, at the same time comparatively very few larvæ have been made known. Thus the proportion will be somewhat below two per cent. This refers to the whole world. For the European fauna the proportion is of course considerably higher, while for the North American fauna, the proportion is but little above the average, and hardly reaches 1 to 40, including all of the unpublished larvæ which are in our collections. Of the 83 families of the North American Coleoptera, the larvæ of no less than 20 families are entirely unknown."

In consideration of the contributions made toward the advancement of entomological science through the investigations and publications of the Division of Entomology of the U. S. Department of Agriculture, it must be source of gratification to us all, that at no time since the establishment of the bureau, has it been in position to render more efficient service than at the present. The recognition of its value and importance has drawn to it the aid and the support that it needs for its successful operations. It is much to be regretted that just at this time, its activity should be somewhat impaired, by the ill health of its Chief Officer, compelling a temporary respite from official duties. I know that you will unite with me in the earnest desire that the restoration of health which he is seeking in rest abroad, may be speedy and complete.

Valuable aid to economic entomology may be confidently expected

from the "Division of Economic Ornithology and Mammalogy", recently established in Washington, under charge of Dr. C. Hart Meriam, in the investigations that are being conducted by it in the food-habits of our insectivorous birds.

The appointment of one of the active members and an officer of our own club, to the assistant curatorship of the Department of Entomology of the National Museum, under provisions that will permit of the proper care and increase of the collections, is a gratifying event of the past year. This Department now contains the Riley collection recently donated to it of 15,000 species and 115,000 specimens; the collection of the Department of Agriculture of 50,000 specimens, and probably 5000 species not in the Riley collection; the collection of the National Museum proper, estimated at 20,000 specimens, and 2,000 species not in the other collections; and the New Orleans Exposition exhibited collection of economic entomology, of which a catalogue has been printed and distributed.

The aggregate may be given as 200,000 mounted specimens, and 26,000 distinct species. (*Science*, November 20, 1885, vi, p. 445.)

The admirably prepared collection of Lepidoptera of Mr. Otto Meske, of Albany, N. Y., embracing a fine exhibit of the New York fauna, rare material from Texas and other western States, together with an excellent representation of the European fauna, received through the exchanges conducted for many years with Dr. A. Speyer, of Austria, has recently been purchased by the National Museum, and is now in its possession.

The collection of Insects of the Peabody Academy of Science, at Salem, has been deposited in the Museum of Comparative Zoology at Cambridge. It had mainly been brought together by Prof. A. S. Packard, and contained a large proportion of his types, including all those, (except four belonging to other entomologists) of his Monograph of Geometrid Moths. It also contained types of other eminent entomologists.

I feel that an apology is due for the length of my paper. Its excuse must be found in the activity that has characterized entomological study for the past year. Even in the time that I have occupied, I have only been able to refer to some of the work done, while omitttng much that is equally—perhaps more worthy of notice.

(To be continued.)

On the reported occurence of Leptura variicornis in North America.

By E. A. Schwarz.

Mr. C. A. Dohrn ("Exotisches", No. 333; Stett. Entom. Zeit. 1886 p. 191—2) recites that some years since he received from Dr. Leconte a vial of alcoholic Coleoptera marked "Cross Lake to Cumberland House", British America, and that among them there was a *Leptura*, which upon comparison with Russian specimens proved to be identical "in all essential points" with *L. variicornis* Dalman; the only difference being in the coloration of the antennæ. In Dohrn's American specimen the 6th and 8th antennal joints are entirely yellow, whereas in the typical *variicornis* they are black with a yellow basal spot. Mr. Dohrn does not consider this difference as having specific importance and expresses his astonishment at not finding *L. variicornis* in any published catalogue of North American Coleoptera.

To any one familiar with our present knowledge of the distribution of N. A. Coleoptera it would appear highly improbable that the locality above mentioned should furnish a *Leptura* not yet represented in our collections; it would appear still more improbable that Dr. Leconte should have overlooked—as Mr. Dohrn seems to assume—a species new to our fauna of the size indicated by *L. variicornis*. Thus, when Dr. Horn (who had not yet seen the Stettiner Ent. Zeitung for 1886) recently called my attention to the above note, I felt convinced that there must be something wrong with Dohrn's conclusions. Upon comparing Leconte's table of N. A. Lepturæ (New Species, Smithson. Misc. Coll. 264, 1873, p. 215—223) with Ganglbauer's careful description of *L. variicornis* (Verh. Zool. Bot. Ver., Wien, XXXI, 1881, p. 704 [Dalman's original description not being accessible to me at present]), it became at once evident to me that Mr. Dohrn had before him a female specimen of our common *L. canadensis* of the form known as *erythroptera* Kirby. Subsequent comparison of specimens with Ganglbauer's description corroborated my opinion.

To be brief, the red female of our *L. canadensis* answers perfectly to the description of *variicornis*, and since we have through Mr. Dohrn an actual comparison of specimens, there is but little doubt left of the identity of *L. variicornis* with *canadensis* var. *erythroptera*. The coloration of the antennal joints in *canadensis* is by no means constant; in the male they are often entirely black, in the female the 6th and 8th joints are sometimes entirely yellow or more or less tipped with black. Still, to make certain of the identity, a comparison of the males is still neccessary. Strangely enough Prof. Ganglbauer does not describe that sex in

variicornis though carefully noting the sexual differences in other Lepturæ. Is the male of *variicornis* unknown to European collections? In the male of *canadensis*, which is at once known by the serrate and longer antennæ, the elytra are usually black with the base red, or they are entirely black. Very rarely the red color extends beyond the middle of the elytra. In the female the form with entirely red elytra is most common, but specimens with entirely black or bicolored elytra are also not rare.

If the identity of the two species should be confirmed, the synonymy, so far as it relates to the variety under consideration would stand as follows:

Leptura canadensis Fabr. *var.* **variicornis** Dalm. *erythroptera* Kirby *cinnamoptera* Hald.

Lepidopterological Notes.

By Geo. D. Hulst.

Mr. David Bruce of Brockport, N. Y., writes us; "Last year all the Choke Cherry trees were infested with larvæ that webbed together the terminal leaves on most of the long branches, completely enveloping them with a bag. Short stumpy larvæ with reddish head, and with dull green and white lines down the body, fed inside the webs, in numbers varying from 30 to 100. I saved quite a lot, and they emerged *Hydria undulata* Linn. I now remember that was the habit of the insect on Sallow in England."

This is our first knowledge of the food plant of this species in this country. It is curious that while the insect is the same as that of Europe, the food plant there is willow.

Mr. Bruce also writes of *Selenia kentaria* Grt., "it is not generally known that this insect is double brooded. All the European species also are The spring brood is so much larger and richer colored than the late summer brood that the latter may be thought to be another species as was the case with the European. The larva of *S. kentaria* is not uncommon on Maple and Birch in the vicinity of Brockport.

Mr. Bruce writes further that he has had *Spilosoma congrua* emerge from eggs laid last June and says "they vary exceedingly. I have some ♀s with distinct black spots on the top of the abdomen, and some ♂s as nearly pure white as possible, and some well spotted." In view of this there remains hardly a doubt that *S. antigone* Streck., is a synonym of *S. congrua* Walk. As is told Ento. Amer. Vol. II, p. 15, the larva is not at all *Spilosoma* like, but strictly an *Arctia* in appearance.

Mr. Bruce yet further in his writing tells of his experience in col-

lecting this season on Willow bloom. He says (the date is April 19th) "I have just come in from the wood at the back of my house, and I wish you had been with me to see the swarms of Geometrid Moths on Sallow blossoms. The following species were abundant *Triphosa dubitata*, *Rheumaptera* 2 species, *Lobophora* 2 species, *Epirrita* 1 species, *Eupithecia* 3 species, *Anticlea vasiliata*, *Cymatophora* 2 species, *Hydria undulata*. Of Noctuids there were *Thyatira pudens*, *Tæniocampas*, *Calocampas*, 3 species, *Scopelosomas*, *Lithophanes*, and *Mamestra distincta.*"

Society News.

Entomological Society of Washington. September 2, 1886. Mr. Schwarz exhibited and explained the primary galleries made by an undescribed species of Pityophthorus under the bark of Red Oak. The female beetle bores through the bark and then a short distance straight downward. A long transverse gallery crosses this vertical gallery immediately below the entrance hole. It appears that the vertical gallery is constructed solely for the purpose of enabling the beetle to turn around without getting on the outside of the tree. The differences between this species (which Mr. S. intends to describe as *P. querciperda*) and the closely allied *P. minutissimus* were also pointed out.

Mr. Smith gave an account of news received from Tennessee and Virginia where *Dynastes tityus* has appeared in the light of a nuisance—being so abundant as to cause such a pollution of the atmosphere that the health officers—not knowing the true source of the odors made vigorous war fare against pools, pigpens and other unsavory localities,—without success of course. Mr. Lugger stated that in the vicinity of Memphis there were thousands of stumps of trees cut down some years since and affording an abundance of food for the species. He states that here the water ash is its favorite food. He states that on the shore of Eastern Maryland he attracted the insect by bruising ash twigs—a friend from Mexico having advised him that in that country they were so taken. Females only were attracted in that way—willow also exercised some attraction, but to much less extent. Males had a fashion of flying into the chimneys of cabins, and he had found remains of as many as fifty in a single deserted cabin. Mr. Smith remarked that this seemed to prove a community of habit between *tityus* and *grantii*, which Mr. Doll had found in Mountain ash in Arizona. Mr. Schwarz mentioned a number of species of Lamellicorns having perceptible odors and especially mentioned *Polybrevipes* which had rather a pleasant smell both as larva and pupa, but no trace of it in the imago. Mr. Lugger stated that the odor of Dynastes was as lasting as it was disagreeable—a box containing them for some, time still retained the odor, though it was fully four years since they had been removed, the box re-papered and another family of beetles put into it. He also mentioned that there had been some mention of *Lucanus elaphus* as a pest in some parts of the country. Mr. Smith stated that he had seen the pupa of the ♂ of this species and it had between the anal forks the same spiral coil of intestinal or other structure that Mr. Schaupp described and figured as present in *Dorcus*. There was some discussion as the the nature of this coil, and it having been suggested that it might be a parasite, Dr. Marx related that Prof. Atkinson had taken from the body of a

large *Lycosa* a *Gordius* 14 inches in length. Mr. Lugger related that from a small specimen of *Platynus cupreus* he had drawn a *Gordius* 11 inches in length and left a portion still in the body.

Mr. Smith described the brush of hair at the base of the abdomen in the ♂ of *Lygranthoecia marginata*. There is a groove between the dorsal and ventral portion of the basal two segments and in this lies concealed a tuft of long hair. It is fastened to a cup-shaped membraneous disc at the base of the abdomen, and is twisted rope like for half its length. When first forced out of the groove and expanded there was a very strong odor, similar to that of the parallel organs in *P. isabella* and *L. acræa*. Mr. Schwarz, who first called attention to these organs a year ago at Ann Arbor, confirmed Mr. Smith's observation as to the structure and the odor, and stated that he had succeeded in replacing a tuft into its groove, though not so completely as it had been before being disturbed.

Mr. Schwarz exhibited a male specimen of *Merope tuber* Newm., (family Panorpidæ), found by him under a stone near Washington on August 22nd, and gave a history of this anomalous and rare insect. He also exhibited two females of *Chætocœlus setosus* Lec., found on July 28th in the vicinity of Washington on dead oak twigs. The only hitherto known locality for this Malachiid beetle was Columbus, Texas. Mr. Schwarz finally called attention to a beautiful and undescribed variety of the common *Conotrachelus anaglypticus* in which the reddish and orange colors of the pubescence are replaced by a beautiful snow-white.

Meeting Oct. 2, 1886. — Mr. Howard read a paper on the larval habits of *Hydropsyche*. He had found the larvæ of a species of this genus very abundant in Rock Creek near Washington where they were feeding upon the larvæ of *Simulium*. He described the webs and spoke at length on the habits.

Mr. Lugger presented a list of a small collection of Coleoptera made at Albaca, Bahama Islands, by members of the Zoological Station of the Johns Hopkins University. More than three-fourth of the species are widely distributed, occurring from the Southern States of North America through the West Indies to South America; the few species not occurring within the United States are known from Cuba. Messrs. Smith and Schwarz added some remarks on the character of the insect fauna of the Bahama Islands.

Mr. Schwarz commenting on Mr. C. A. Dohrn's publication regarding the occurrence of *Leptura variicornis* Dalm. in North America, stated that Dohrn's Canadian specimen is no doubt a female of the common *Leptura canadensis* var. *erythroptera*. He further criticized Mr. Fleutiaux's attempt (*Le Naturaliste*, VIII, No. 41, p. 327) to revive the question of the specific distinctness of *Amblychila Piccolominii*.

Mr. Schwarz gave a history of the spread of *Crioceris asparagi* within the United States and reported its occurrence this season at Fortress Monroe, Va. From the circumstances under which the insect was found he concluded that it did not gradually spread along the lower Potomac through the more northern parts of Virginia but that it had flown directly across the Bay from the opposite shore of Virginia. Mr. Lugger corroborated this opinion by relating his observations on the spread of the Crioceris in Maryland. During the past few seasons the species had spread rapidly southward from Baltimore along the shores of the Chesapeake Bay.

Mr. Heidemann exhibited some Hemiptera Heteroptera which he considers rare or new to the fauna of the District of Columbia.

AN EXPLANATION.

Our last number was a double one, and as this unusual issue has caused considerable inquiry we desire to explain. Late in September we received word that the Manuscript of the Proceedings of the Entomological Club was on the way to us, and as we were desirous of getting some of this in, we delayed the printer until its arrival. The manuscript had been mailed by Prof. Lintner in Albany on the 4th or 5th of October—it was after the 20th when we received it. —By that time we had given it up as lost, and had set the printer to work on other matter. Then, as fate would have it, the big press met with an accident and was in the hospital for two weeks or thereabouts. The first of the month had long passed, and we decided as the manuscript was then all at hand, to issue a double number. The accumulation of work caused by the breakage of the press caused more delay, and finally when the proof came in it was read in a hurry, once only—as a result more mistakes than usual crept in, and we present a page of errata—no proofs were sent to authors and they are not responsible for errors.

The numerous letters received by us soon after October 1st showed how much our friends had learned to rely on the prompt appearance of the paper, and this explanation is made to them in the hope that we may never have occasion to make another.

ERRATA.

Page 138, for genns, line 7 from bottom, read genus.
" 139, " *Malthodus*, line 4 read *Malthodes* for smaller in, line 20 read smaller than in.
" 141, for Overthur, line 11 read Oberthür.
" 144, line 15, for 55 read 25.
" " " 34, " I. W, Fyles read T. W. Fyles.
" 45, " 14, " preparations " preparation.
" " " 32, " 1866 read 1886.
" " " 38, " Edward read Edwards.
" " " 40. " p. 192 read i, p. 92.
" " " 41, " 102 read 101.
" 147 " 9, " xviii " xvii.
" " " 17, " as carpet-feeder read as a carpet-feeder.
" " " 32, " also read has also.
" " " 34, " *Coleopa* read *Cœlopa*.
" " " 36, " collection read collation.
" 148, " 7, " Transaction read Transactions,
" " lines 11, 12, 13, 15, 16, 18, 19, the brackets should be parentheses.
" " line 22, for A. L. Packard read A. S. Packard.

" 149, " 6, " Casino read Cassino.
" " " 6, " octave read octavo.
" " " 40, " subfamily read subfamilies.
" 150, " 13, " *Myriapoden* read *Myriopoden*.
" 151, " 29, " *Typhlodomus* read *Typhlodromus*.
" 153, " 10, " inasmuch as it read which.
" " " 37, " attention the read attention to the.
" " " " " propogation " propagation.
" 154, lines 15 and 27, after species and Fisher *dele* the comma.
" " line 37, for form read from.
" " last line, for No. 2 read No. 12.
" 155, line 4, for xvii read xviii.
" " " 25, should be followed by top paragraph of p. 156.
" " " next to bottom, for occurence read occurrence.
" 156, " 30, for conclusion read conclusions.
" " " 37, " will appears read would appear.
" 157, " 4, " Ecner read Exner.
" " " 9, " facetted read faceted.
" 158, " 5, " Edward's read Edwards'.
" " " 8, " Chambre's read Chambers'.
" " " 38, " *Carabidaæ* " *Carabidæ*.
" 159, " 6, " *Staphilinidæ* read *Staphylinidæ*.
" " " 18, " larva read larvæ.
" " " 32, " be source read a source.
" 160, " 2, " Meriam read Merriam.
" " lines 17 and 18 belong to the preceding paragraph.
" 163, for food, line 25, read food.
" " " to much, line 30, read to a much.
" " " *Polybrevipes*, line 35, read *Polymechus brevipes*.
" " " some, time line 38, read some time,.

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Apparently new forms of N. American Heterocera.

By HENRY EDWARDS

The following species which I believe to be unrecorded, are all in my own collection, and have many of them stood for some years without names. There are only one or two uniques among them, and I have confidence that they will be found to be new to our entomological fauna.

Family **BOMBYCIDÆ.**

Daritis Thetis, Klug var. **Howardi** n. var.

About 2 years ago, I received from my old friend Mr. Wilson Howard, two specimens of this magnificent moth, which had been taken by him in New Mexico. I have delayed its description as Mr. R. H. Stretch promised to make a figure of it for me. He has however since then had his time taken up with other matters, and the figure has not come to hand. I therefore think it best to call attention to this remarkable addition to our fauna.

The type of *D. Thetis* is figured by Klug in his Neue Schmett. pl. IV, fig. 1 and 2, 1836, as an *Euprepia*, but Walker separated it and its kindred species under the name of *Daritis*. *D. Thetis* is quite common in some parts of Old Mexico, but there is considerable difference in the form before us and it well deserves a varietal name.

The ground color of the forewings is decidedly black, and not brown as in *D. Thetis*, and the stripes and bands are of a clearer white and much broader. The lower wings have a much larger white field, owing to the narrower margin, the ground color of which is scarlet in the place of orange with the blue lunules larger, and nearly touching the edge of the marginal band. The tibiæ are bright citron yellow, as in the typical form.

3 examples. N. Mexico. (Wilson Howard).

It is with great pleasure that I dedicate this grand addition to our fauna, to my old and valued friend.

Euprepia caja, var. **utahensis.** n. var.

While collecting in Salt Lake City some two years ago, I took at the electric lights about 40 specimens of a form, which differs so much from *Arctia americana* as to deserve to be marked by name as a good variety. In it the white bands of the primaries are invariably very much wider than in *A. americana*, and the base of the wings is in some specimens wholly white with three brown spots. The head and collar are invariably much redder than in the other form, while the secondaries are always pale orange and never red as in *americana*. It is indeed a more exaggerated type of *caja* much whiter and paler than any European example I have seen, and remarkably constant to its characters. One specimen however has the collar and sides of the thorax pale yellow. It would be interesting to trace the early stages of this strongly aberrant form, and as it is abundant in August, there ought to be little difficulty in so doing.

Halisidota laqueata. n. sp.

Wings but slightly clothed with scales. The primaries are marked with brown streaks between the nervules, and following their course. Those on the costa, in the cell, and along the internal margin are the most strongly marked. The costa is pinkish white, and at base of internal margin is a pale pink blotch. The submarginal line is indicated by brown dashes. The secondaries are subhyaline with the margin narrowly dusky. Beneath both wings are subhyaline, with the margins broadly dusky. Antennæ rather long with the shaft cream color and the pectinations ochreous. Head black with pink streak at base of antennæ extending around the eyes, and to the base of the palpi, which are black above, cream color beneath. Collar pale crimson in front, with the edges pink posteriorly. Tegulæ striped with pink, the inner streak being rather broad. Abdomen reddish orange, shading into crimson posteriorly, with the anal segment black. Sides black, with the upper edge triangular on the segments, and with a broken cream color lateral streak. There are small triangular black patches on the center of the 6th and 7th segments above. Beneath the abdomen is sordid white, with the 2 anal segments black. The tibiæ are cream color without, rosy within, the fore pair with a blackish blotch. Tarsi dull cream color.

1 ♀, Texas. Coll. D. Bruce.

Expanse of wings. 48, mm.

An exquisite species, widely differing from any other in our fauna.

Nelphe carolina, n. sp.

Primaries sordid white, with olivaceous markings. These are arranged in a series of spots, mostly oblong in shape, and placed between the nervures: those across the middle of the wing and the cell being the largest, giving the wing a somewhat tesselated appearance. The nervures are also olivaceous, the costal region being the same color but of a paler shade than the spots, of which three on the costa are quite conspicuous. There are cuneate olivaceous dashes between the nervures on the margin. Secondaries slightly hyaline, with the border narrowly olivaceous. Thorax

also streaked with two olive shades. Abdomen dull yellow on the posterior half, the base and dorsal streak being olivaceous. Beneath the markings of the primaries are more confused, the margins of the wing and some spots in the center being pale. Secondaries same as on upper side. The feet and legs are stone drab, with blackish blotches.

Exp. wings 31, mm. Length of body 12, mm. 3 examples ♂. ♀. Indian River, Florida.

I place this curious insect in H. Schaeffer's genus at the suggestion of Mr. Grote. It is however remarkably like a small *Halisidota*.

Ichthyura bifiria n, sp.

Closely allied to *I. brucei*, Hy. Edw. but still widely differing in important particulars. The general color is a bright silver gray, the white lines all very clearly defined, and the brown shades very strongly contrasted. The basal line is slightly oblique with a sharp tooth in the middle. The second line is nearly straight, joining the third, (which is oblique) exactly in the middle. The third line runs sharply to a space 2 mm. from the internal margin, where it is joined by the fourth line, which is sinuate, and opens into a white dentate triangular mark 4 mm. from the apex. There is a dark brown cloud surrounding this fourth line in the costal region, and the line is edged with reddish brown posteriorily, another brown cloud at the junction of the third and fourth line, a submarginal broken line of black spots, and numerous blackish irrorations over the whole surface. Behind the brown sub apical cloud is a whitish shade. Secondaries silver gray with blackish scales over the whole surface. Thorax with central brown tuft narrow and extending over the front of the head. Abdomen silver gray, grizzled with black. Under side wholly darker gray, with blackish scales, and the white sub-apical streak very distinct. Shaft of antennæ white, pectinations fawn color. The anal tuft is tipped with dark brown, and the orbits of the eyes are surrounded by a dark shading of the same color.

Ex. wings, 28 mm. Length of body, 16 mm.

Soda Springs, Shasta Co., Cal. J. Behrens.

Gluphisia severa. n. sp.

♀. Base of the primaries blackish gray as far as the t. a. line, but covered thickly with black scales, and the basal half line distinctly black. The t. a. line is broad, velvety black, not quite reaching the costa, and is preceeded by a whitish shade. The t. p. line is dentate; whitish, more oblique than the t. a., which turns abruptly at a right angle just as it reaches the costa. The median space is velvety black, varied with dull gray and chestnut brown, the latter about the anterior portion. At the posterior end of the cell is an ochreous dash. Margins of the wing broadly gray with olivaceous dashes, and blackish irrorations. Fringe gray mottled with brown and olive. Secondaries smoky white, passing into dusky toward the margins with slightly waved median band, and a black anal spot broken up with gray. Thorax gray. Abdomen brown, mottled with gray. Beneath, the surface is wholly gray, with the bands and markings geminate, and darker than the ground color. There is no trace of the black, so conspicuous in the median space of the upper side, and the color is far lighter.

Exp. wings, 45 mm. Length of body, 17 mm.

1 ♀. Soda Springs. Shasta Co., Cal. J. Behrens.

I place this fine insect, (which is utterly unlike anything I have ever before seen, provisionally in the genus *Gluphisia*,

though I believe that, together with *G. Wrightii*, (with which the present species is congeneric) they should form the types of a new genus. The head which is small, is deeply imbedded in the thorax, and is concealed by the hairy front. The antennal structure is very peculiar, the shaft bearing pectinations only for its terminal third the rest being simple, but covered with long scales. The tibiæ are very densely clothed with long hairs, and the tarsi, which are very short even for the Bombycidæ, are covered with long scales. The abdomen is stout and very hairy, and extends a little beyond the hind wings. It is perhaps wrong to found a genus only upon one sex, and I prefer therefore that this interesting species should remain temporarily in the genus to which it appears to me to be most closely related.

Eggs. Two eggs which I found attached to the abdomen are flattened at their base, circular, of a dull amber color, with the apex slighly paler. Their diameter is about one mm.

Pheosia Portlandia, n. sp.

In this form, which appears to be widely separated from either of those in Grote's Check List, the whole of the insect is very much darker in color, in addition to great difference in the markings. I have a ♂ and ♀ quite agreeing with each other, and feel confident that we have to do with a new species. In the ♂ the primaries are very dark smoky brown, almost black on the costal third, with a light smoke colored cloud near the apex. From the middle of the base to about the third of the internal margin runs a black velvety line, edged inwardly with white, and resting upon a distinct white angular streak. Inside of this streak, the base is fawn-color. The middle of the internal margin is produced as in the others of the group, and is brown black. The posterior margin is shaded with whitish, though this shading is obsolete before reaching the costa. The nervules are darker than the ground color. Secondaries smoky, palest on disk, and darkest at the anal angle, where there is a blackish patch, with a few white scales. Beneath, the whole wings dusky with whitish patches on the costa and at the apex of the primaries. On the secondaries is a faint trace of a paler median band. Thorax blackish brown, with a few white scales at the sides. Abdomen smoky drab. Exp. wings, 50 mm. Length of body, 18 mm. ♀. A little lighter in color than the ♂ especially on the secondaries. The white lines, and the whitish patches are more clear than in the other sex, and there is a white blotch on the costa, near the apical third. The center of secondaries becomes a sordid white, and the lower side has the median pale band, common to both wings, lighter than in the ♂. In other respects there is little difference in the sexes.

Exp. wings, 54, mm. Length of body. 24, mm.

♂, ♀. Taken at light, at Portland, Oregon, by Mr. James Behrens.

Fam. **NOCTUIDÆ**.

Raphia pallula, n. sp.

Ground color of primaries yellowish fawn-color, considerably obscured by black irrorations, the lines being only faintly determined. The basal line is broadly shaded with black, a black shade at base of internal margin, and two black triangular blotches on the costa. The t. a. line is almost obsolete, and the t. p. line very faint,

but easily distinguishable. It is waved outwardly in the middle, as in *R. frater*, and is similar in shape to the same line in that species. The reniform and subreniform are wanting. The posterior margin is flecked with black and white, the extreme marginal line consisting of black lunules. In the median space are some whitish shades. Fringe grizzled with white and black. The secondaries are sordid white, with a marginal row of black lunules, and some small black irrorations scattered over the sub-marginal surface. Head, collar, and disk of thorax grizzled black and white. Tegulæ yellow fawn colur, edged with black and white. Abdomen brownish, with the tufts grizzled. Beneath the wings are pale drab, with blackish flecks, and faint blackish discal spots, the margins showing the blackish lunules. Feet and legs fawn color, spotted with gray and black,

Exp. wings 36, mm. 2 ♀. Siskiyou Co. Cal. (J. Behrens).

The coloring of this apparently rare species, is very peculiar and will serve to distinguish it from any other form.

Apatela Americana, var. obscura. s. var.

A very dark form in which the primaries are a much duller and darker gray than the tyye, the lines being thus rendered less distinct, and the secondaries being wholly dull smoky brown, the median waved band being lost in the deeper shade of the ground color. Common at Kansas City, Mo. in August, and there apparently replacing the paler northern form,

Perigea fasciata, n. sp.

Light stone color, with whitish and fawn shades. Base dull sordid white, enclosing the basal and t. a. lines both of which are but faintly shown. The latter passes straight across the wing without any dentation. Between it, and the t. p. line is a rather broad whitish space. The t. p. is dark, and rather broadly edged with a brownish fascia, behind which are some fawn-colored shades. Sub-marginal line dark brown, with white scales intermixed, and at internal angle, a rather clear white spot. Fringes alternately brown and white. Secondaries pale drab at the base, clouded rather broadly on the margin, more so in the ♀ than in the ♂. Underside dull sordid white clouded on the margins, with darker discal spot, a common median line, and some triangular marks along the costa of primaries. Thorax and abdomen concolorous.

Exp. wings ♂, 21, mm. ♀, 26, mm.

Several examples. Colorado desert. (R. H. Stretch.)

Deva morigera, n. sp.

General color fawn drab, mottled with darker shades. The primaries have a slight golden sheen. From the base runs a double white, rather broad line touching the median nerve at the forward end of the cell, and here surmounted by a triangular double white line, the apex of which does not quite reach the costa, but rests on the subcostal nerve. From this triangular mark which encloses a brown space, the broad line runs a little obliquely inwardly until it reaches the somewhat waved white posterior line. This latter has a double tooth near the internal margin, and is then nearly straight to the apical region, where it is lost in a clear white cloud. The posterior space is richly shaded with brown, and the same color is apparent in the mid-

dle of the wing broken only by the double whitish line. The margin is brown, passing into whitish at the internal angle. Fringe dull whitish, mottled with brown. Secondaries dull fawn-color, with faint median band. Beneath, the wings are fawn drab with darker shadings, and with the bands very apparent. Thorax fawn drab, edges of the collar and tegulæ marked with white. Abdomen and legs fawn drab above and below.

Exp. wings, 32 mm. 1 ♀. Colorado. (D Bruce.)

I place this beautiful insect, (a fine example of which I owe to the kindness of my friend Mr. Bruce) in the sub-genus, *Deva*, Walker, as in shape and general appearance it bears great resemblance to the well-known *D. purpurigera*. In the present species however, the palpi are very long, the terminal article being broad and flattened, with long hairs. In the other two N. American species of *Deva* the palpi are somewhat shorter than in this, though considerably longer than those of *Plusia* proper and it was mainly upon this character that Walker founded his genus, the validity of which has been accepted by Mr. Grote. The thoracic tufts also are flatter and more spreading. If *Deva* be allowed to stand as a genus distinct from *Plusia*, the European *Plusia moneta* must be removed to it.

Plusia vaccinii, n. sp.

Size of *P. u-aureum*, with the same style of clouded markings on the primaries. The lines are however, straighter, and not so deeply dentate as in that species and there is a marked difference in the shape of the metallic spot. In the present form it is obtusely triangular, and seperated by a rather wide interval from a small round dot. The ground color of the wing is also paler towards the internal angle. The secondaries are paler, more inclining to fawn-color on the disk, with a faint median band, and the margins broadly dusky.

We owe the discovery of this species to Mr. Roland Thaxter, who took it on Mt, Washington. N. H., in July, and also raised it from the larva found by him feeding upon a species of *Vaccinium*. Mr. Thaxter states that it is diurnal in its habits, and that it flies among the rocks near the summit of the mountain. It is at Mr. Thaxter's suggestion that I name the species after its food-plant.

Plusia californica. Geyer.

Some exquisite specimens of a variation of this species, in which the median space is largely suffused with bright reddish brown, giving a different appearance from the typical form, have been taken by Mr. D. Bruce and myself in Colorado and California. To distinguish it, I propose for it the varietal name of *P. russea*, n. var.

I may here mention that, with reference th the wide distribution of species of *Plusia*, I have in my collection examples of *P. biloba*, Steph. from Mexico, California, and Bogota, and of *P. verruca*, Fab. from Venezuela and Brazil.

Phoberia indiscreta, n. sp.

Whole upper surface, light fawn-drab. Basal half line of primaries reduced to

two round blackish dots. T. a. line nearly straight, very slightly waved on the costa. T. p. line nearly obsolete. Reniform pale in front, with blackish longitudinal dash posteriorly and connected with a dark shade reaching to internal margin. Margins of wing rather deeply notched, with black dots at the extremity of the nervules.

Secondaries a trifle paler towards the base. Underside wholly pale fawn color, with black irrorations, and rather large discal spots on primaries. Fringes as well as the thorax and abdomen concolorous with the wings,

Exp. wings, 42 mm.

1 ♀. Havilah, Kern Co., Cal., (R. H. Stretch).

I think this form is rightly placed, though I had formerly regarded it as near *Synedoida*. Indeed, I think *S. valens*, Hy. Edwards, should also find its position here. It is probable that the examination of these two species led Mr. Grote to place the latter genus near to *Toxocampa*.

Pleonectyptera obliqualis, n. sp.

Very pale fawn drab, with a pinkish tinge. The anterior line is discontinued a little beyond the middle, while the posterior is perfectly straight, and goes obliquely to the costa at about 3 mm. from the apex. Both these lines are bright chestnut brown, though slightly indistinct, the space between them being paler than the rest of the wing. The submarginal line is composed of a broken series of dark brown dots, and there are also brown dots at the ends of the nervules. The secondaries have a faint indication of a median band. Beneath, both wings are stained with reddish, particularly towards the margins, and the lower side of the abdomen, tibiae and tarsi are marked with the same color,

Exp. wings, 21 mm,, 1 ♂, Texas. (Belfrage.)

Fam. **PYRALIDÆ**.

Prorasea brunneogrisea. n. sp.

Primaries shaded with white and brown. The whole of the base and the costal region very widely whitish, the white becoming clearer as it approaches the apex. There are two oblique dashes of brown on costa at the apical third, and some streaks of brown are intermingled with the white ground color. The posterior margin is broadly brownish, and this color extends along the internal margin, but stops short within 2 mm. of the base. In the brown cloud at the internal angle is a faint dentate white line. This may represent the t. p. line. The submarginal line, is incomplete, whitish, lost before the middle, while the t. a. line is very oblique from a point 2 mm. from the base, straight until it reaches the median nervure, thence in an opposite direction towards the costa, forming an acute angle at the cell, and again acutely angular to the costa. The lower wings are silver drab, with a darker margin, the fringe with a dark line, and an oblong dark patch between veins 3 and 4, which is edged above and below with white. Beneath the color is pale fawn drab, with the margins and fringes darker, and with a darker oblique blotch on the costa near the apex. Thorax mixed with brown and white. Abdomen and legs fawn color.

Exp. wings, 26 mm., 1 ♂, Prescot, Arizona.

More decided in its markings than any other species of the genus, the shades of color being more strongly contrasted, and the lines less apparent. The wings are also narrower than those of *P. simalis*.

Proceedings of the Entomological Club of the A. A. A. S.

(Continued from page 160.)

Dr. D. S. Kellicott on behalf of the Buffalo Society of Natural History placed the rooms of the Society at the disposal of the club and tendered the members a cordial welcome to the City.

On motion the Secretary was requested to furnish Mr. J. B. Smith with a copy of the minutes of the meeting for publication in Entomologica Americana.

Prof. Wm. Saunders stated that he had recently met Prof. Riley in England and was glad to be able to say that his health was much improved.

Prof. J. H. Comstock of Ithaca explained a new method of arranging Entomological collections so as to avoid loss of time in making necessary changes in their arrangements.

A communication of this plan had been sent to Science and appeared in Number 108, Vol. V, Feb. 27th, 1885.

This plan, based on the same principle as the Slip System of keeping notes, consists of a series of movable blocks of various sizes, but so adapted to a standard size that the case can always be filled with these blocks on which the insects are pinned, the idea being to fasten in each case all the specimens illustrating a single species upon a single block: where addition or change is desirable a fresh block can be inserted without disturbing the specimens and the end block transferred to the next case.

Prof. Comstock also exhibited some square flat-glass phials he had imported for preserving larvae: the mouth of which is on the upper side so as to prevent the escape of alcohol. Slips of white card of the same width but somewhat longer than the phial are glued to the under side, and the protruding ends are pinned to the bottom of the case in which they are kept and thus their proper position is maintained.

Arrangements were made for the future meeting of the Club at the High School, in which the meetings of the A. A. A. S. are held.

Mr. O. Reinecke of Buffalo gave the members a cordial invitation to visit him on the following afternoon and examine his collection of Coleoptera.

The meeting then adjourned subject to the call of the President.

Thursday Aug. 19, 1886.—The Club met at 9 A. M. in room No. 6 of the High School; The President in the chair; 10 persons present.

The following were then nominated and elected officers of the Club for the ensuing year.

President,	Prof. J. H. Comstock,	Ithaca, N. Y.
Vice President,	Prof. S. A. Forbes,	Champaign, Ill.
Secretary,	Mr. E. Baynes Reed,	London, Canada.

Prof Forbes submitted a few notes on the life history of insects injurious to agriculture, which he had been cultivating. Among these are the Hessian fly, the wheat-bulb worm, the common wire worms, the currant worm, the corn-root worm, and the corn-plant louse. Concerning the latter insect, one of the worst infesting corn, he announced an especially important observation, showing that Indian corn may be protected against it by a regular and frequent rotation of crops.

An account was first given of an irregular and unequally retarded metamorphosis of *Nematus ventricosus*,—a homogeneous lot of half-grown larvæ collected early in May emerging partly in June and July of the same year, and partly in April and May of the year following.

A detailed description was given of the earth-nest of *Crambus zeellus*, and of the method and character of the injury done to corn by this species. This Crambus hibernates as a larva, pupates within its tubular nest in June, and emerges in June and July. It is commonly a grass insect,—corn infested being almost invariably on sod. The larva is attacked by a *Microgaster* and by a *Tachina* fly. It is easily killed by kerosene emulsion poured on the earth containing it, and would probably be poisoned by Paris green dusted upon the lower corn blades.

The larva of *Crambus exsiccatus* was this year also found injurious to corn planted on old grass land.

The Hessian fly (*Cecidomyia destructor*) has lately been found to hibernate sometimes, in Southern Illinois, as a naked white larva, not forming the puparium until the following May, and then emerging before harvest, as far as known. These naked winter larvæ are believed to be the offspring of a midsummer brood which develops in volunteer wheat, and yields the imago early in autumn.

The clover seed midge (*Cecidomyia leguminicola*) was observed in Ill. as early as 1879, a fact which makes its eastern origin doubtful. A new chalcid parasite (*Tetrastichus*) of the larva was reported; but its worst enemy so far observed in *Triphleps insidiosus*. The young of this species are often so abundant on the clover heads as to be mistaken for the authors of the injury to clover; but experiments showed that they attack the midge larvæ promptly and soon destroy it by piercing the body and sucking the blood.

Some observations of the summer indicate that *Meromyza americana*

is three-brooded, instead of merely two-brooded as has been heretofore supposed. Eggs and half grown larvæ were found in abundance on young wheat August 4.

Two species of *Melanotus* (*M. communis*, and *cribulosus*) were bred to the imago, with a third elaterid as yet undetermined, and figures and precise descriptions of the immature stages of these species have been prepared. Larvæ of all these species, of *Agriotes mancus*, and of a *Cardiophorus*, were reported as injurious to Indian corn;—the latter very peculiar larva boring the roots in all directions, in sandy soil in Southern Illinois. These larvæ were apparently full grown June 24, but no pupæ were found. *Melanotus cribulosus* pupates in July, and forms the imago by September, but in the Laboratory experiments did not emerge from the ground until the following spring.

The extention southward of observed injuries by the corn root worm (*Diabrotica longicornis*) was next reported, fields having been seriously injured in extreme Southern Illinois, where water had stood for three weeks in the spring. That this, now possibly the worst of the corn insects in Illinois, was rare in that region twenty years ago, seems implied by a remark of Walsh in the Practical Entomologist (Vol. II., p. 10,) to the effect that he had taken three specimens on flowers in Illinois many years before.

The common pale flea beetle (*Systena blanda*) usually feeding as an imago on leaves of *Xanthium strumarium*, was bred this year from slender white larvæ feeding on kernels of sprouting corn in the earth—specimens collected May 17 pupating May 26—June 10 and emerging June 17.

Epicærus imbricatus feeds on leaves of pear in May (imagos apparently emerging from the ground,) and lays its eggs in a single layer on the leaves, afterwards concealing them by gumming the leaves together by their opposed surfaces.

The larva of *Sphenophorus parvulus* was discovered to infest the roots of meadow grasses (Timothy) hollowing out the bulbs from beneath. These larvæ (not heretofore identified) pupated after July 21, and had formed the imago by September 24. A serious injury to hay, in Southern Illinois, was attributable to this insect—a large percentage of the stalks, and even whole stools, being killed by the destruction of the roots. The imago sucks the sap from stems of wheat and corn.

Empoa albopicta, Forbes, was described in September, 1853, by Dr. Wm. LeBaron in the "Prairie Farmer" of Chicago, under the name of *Tettigonia mali*, but as the name, published in an agricultural newspaper, was never afterwards used by entomologists, it should probably be ignored. The species hibernates as an adult, lays its eggs in early summer upon the apple, and is apparently confined to that plant when young.

Later it is found on vegetation in great variety.

It is now apparent that the corn plant louse (*Aphis maidis*) takes its earliest start in spring only in fields in corn the year before: but it may very rapidly mature a winged brood of root lice (in one case in seven days from the planting of the field,) by means of which adjacent fields may be stocked. Laboratory experiments and field observations indicate that the root lice are strictly dependent on the ant, *Lasius alienus*, which mines along the principal roots of the corn, collects the plant lice, and conveys them into these burrows, and there watches and protects them. These ants have nothing to do with the hibernation of the lice, their winter nests never containing them in any form, either in cornfields or in other situations. The facts indicate that the lice hibernate as wingless females in the earth of fields previously infested.

Specimens of the various larvæ were exhibited preserved in spirit.

Several remarks were made on the retarded development of insects.

Rev. C. J. S. Bethune of Port Hope, Ont. instanced the same habit which had recently come under his notice in breeding, *A. Promethea*.

Prof. Forbes in speaking of the attacks of insects remarked that there seemed to be a relation between the presence of the insect and the supply of fruit.

The President asked if Prof. Forbes had found the terminal segments of wire worms of any value in determining generic distinctions.

Prof Forbes thought that they could not be relied on as of specific value, but might be of generic importance.

Prof. L. M. Underwood of Syracuse exhibited a new species of *Phrynus* sent him from Key West: according to Packard; "Phrynus is at once known by the excessively long whip multiarticulate forelegs which apparently perform the office of antennæ; the body is short and broad and has no appendage to the abdomen."

Various specimens of interest were exhibited by Mr. J. A Moffatt of Hamilton, Ont., and Rev. C. J. S. Bethune of Port Hope, Ont.

On motion the club adjourned to meet at 9 a. m. the following morning in the same place.

Friday, August 20th, 1886. The club met pursuant to adjournment at 9 a. m. Prof. Lintner in the chair, 11 members present. Prof. Forbes read the following paper:

A Contribution to the Life History of Aphis maidis, Fitch.

By H. Garman.

In studying the life history of the corn plant louse at the beginning of the summer of 1885, a large frame was erected out of doors and so

enclosed as to exclude insects from without and to prevent those within from escaping. In this inclosed frame three hills of field corn were planted, and on their appearance above ground one of them was stocked with a colony of *Lasius alienus* Forst., the small ant which habitually attends the root form of this plant-louse. The ants made themselves quarters about the roots of the corn, and on the 19th of July a number of wingless viviparous female lice with their young and one pupa were placed within reach of the ants and were at once carried to the roots of the corn by the latter. On the 22d of July other root lice, wingless and winged, were placed near the stocked plants and were also carried to the roots. With a view to learning whether or not root lice would of themselves make their way to the roots of corn, on July 22d, and subsequently, many specimens were placed at the base of one of the hills not colonized with ants. They always disappeared, but could not be found afterwards on the roots. The plants with which they were placed continued to grow as well as the third hill under the cover which from the first had not been disturbed, and at the close of the summer careful search did not disclose lice on the roots. The injurious effect of the lice on the infested plants was soon noticeable in their smaller size and less vigorous growth. At various times during the summer the burrows of the ants along the roots were uncovered, revealing each time the presence of lice. From July 23rd until the first of August winged lice came from these burrows and were sometimes found on the blades of corn but more frequently on the inside of the enclosing cloth of the frame. These winged individuals showed no disposition to establish colonies on the blades of corn, but on the contrary seemed desirous of leaving the plants as soon as possible. All were viviparous females and in several cases confined upon the plants, although sometimes inserting the beak and feeding, they died with the ovaries filled with young. The migration of winged lice from the ground was observed at the same time in neighboring fields where on the 27th of July many of these winged lice, chiefly dead, were found on the blades. A careful search of the roots made at the same time showed that the root form was now rare in situations in which it had done most injury in the spring. Root lice were observed on the enclosed corn until the latter part of August, but were not again uncovered until October 7, the ants in the meantime being constantly observed running in and out. On the morning of October 7th, the infested plants were dug up carefully and carried in doors for careful examination and upon one of the roots which had several times during the season been found to support plant lice was found a small colony of oviparous females, the only egg-laying example

of the species which up to the time had been seen. They bear a close resemblance to the more common viviparous female of the root form as the following description will show:—

The oviparous Female Aphis maidis (*root form*).—General color dull green; body covered with a glaucous bloom. Above, head dusky, prothorax chiefly dusky, the three succeeding segments each with a median transverse dusky blotch, all the segments behind the prothorax with a marginal and submarginal series of dusky specks on each side. Below, head and prothorax dusky, two dark spots outside the coxa of the middle leg, a dusky line before the coxa of the hind leg, abdominal segments with two series of dusky specks on each side and a pair of dark spots before the cauda. Antennæ, two basal articles, third and fourth at tips and fifth and sixth chiefly dusky. Eye brownish red. Rostrum dusky. Anterior and middle legs with the coxæ, femora except at bases, tibiæ at tips and tarsi except bases dusky. Posterior leg, excepting the extreme base of the femur, black. Cornicles black. Cauda with black border. Body stout, its greatest width at about the middle. Outline of front seen from above incurved medially. Antenna with first and second articles equal in length, the first stoutest; third article about equal in length to the fourth and fifth together, the latter nearly equal in length and similar in form; basal part of sixth article shorter than the distal part, about equal to the fifth in length. Cornicles short, not at all swollen at the middle. The limbs and the cauda have the usual slight pubescence of members of the genus Aphis. Length of body 2.27 mm.; Width of body 1.20 mm.; Antenna .80 mm.; Cornicle .20 mm. Perfectly developed eggs taken from the ovaries are oval in shape, pale yellow in color and measure about .73 mm. In addition to the discovery of the oviparous female of the root form another interesting fact in the life history was observed during the season. A careful lookout was kept for any tendency of the plant lice both within and outside the enclosed frame to breed on plants other than corn, and on the 30th of August indubitable *Aphis maidis* of the aerial form were found not uncommon in places on young grasses which later proved to be *Panicum*. After this date they were repeatedly found on the grass. All those examined from the grasses were apterous viviporous females and young.

Prof. Forbes in reply to a question stated that ants were in the habit of collecting aphides and stowing them in their nests for winter use.

The following paper was then read:

A Dangerless, Vegetable Insecticide for Collecting Bottles.

W. L. Devereaux, Clyde, N. Y.

Instructions on collecting insects even in recent important works like Appleton's series, advise the use of chloroform for killing insects.

Others suggest benzine, camphor or ether, which serve, while worrying to death the insect, to worry away the interest of the beginner. Cyanide of Potassium has long since been relied on by entomologists as the only satisfactory collectors insecticide, and, used intelligently and with care, it is a very gratifying agent. Yet there is lurking danger in its action as a cumulative poison with persons who use it in extensive collecting. Setting insects fresh from it, brings a modicum to the inhaled breath. A taxidermist who poisoned an owl with a grain of cyanide was prostrated seriously for several days, by the fumes which arose from the flesh when skinning the bird. I believe some entomologists have suffered impairment of health from this compound. Photographers were injured by its use and that profession is very much relieved to day by the supercedence of this by other chemicals.

It has been deplored that we have not the laurel; the young leaves of which are so much in use by European Entomologists. The "laurel bottle" seems to be a reliable and of course a much more safe one, especially for young collectors than the Cyanide bottle.

We have no species of the genus Laurus like the camphor tree, sweet bay and others. Our American laurel is the *Kalmia latifolia.* Both this and the mock orange are said to be poisonous to the live stock. I have experimented with both these without success. The peach and almond pit abound with the order of cyanogen, also our wild cherry species, (foliage) and I agree with Mr. Fletcher of Ottawa, Ont., who stated at the Ontario Society, in 1884 that their young leaves killed insects but soon became mouldy and inoperative. It is the inner bark of the wild cherry *Prunus serotina* which I find to be a superior substitute for the laurel, and the European laurel is indeed a cherry, *Prunus lauro cerasus*, and not a laurel at all. The bark (serotina) derives its power like the cherry laurel, from its content of Hydrocyanic or prussic acid, and it is the same old cyanic insecticide, but it is in a natural and also dilute form. Hence I assert the importance of the wild cherry bark for use where children are taught Entomology and are expected to collect examples and pursue the science practically. For the expert collector it is useful for all insects but the most tenacious of life. Insects immersed in the *Serotina* odor are exempt that "greasing" happening in cyanide especially that submerged in plaster of paris. Mr. A. S. Fuller's plan of holding the Cyanide down with a piece of tightly fitting pasteboard is cleanlier. The Wild Cherry or *Serotina* bark is abundant everywhere in almost all collecting grounds. Its content of Prussic acid has long been known, but I am not aware that entomologists have used it. I venture it contains a larger percentage than is found in any other vegetable form. (Either the cherry laurel leaf or the mock orange (*P.*

carolina) leaf.) On good chemical authority it is placed as high as .1436 per cent or 7 grains of hydrocyanic acid in 100 gr. of bark, or 8 drops of acid. The bark fluctuates some in strength, in the Seasons. I think Rev. J. C. Wood, (in Insects at Home), overrates the laurel bottle, in stating the largest and fiercest beetle laid, quivering in one second. In treating of *Blaps sulcata* he shows the ineffectiveness of it, and advises hot water. A beetle does not "take off" in a second, in the strongest cyanide. A large *Pterostichus* of the *Peryphus* section requires 2¼ minutes! *Chauliognathus americanus* ½ m., *Pterostichus stygicus* 6 minutes! *Megilla maculata* 1 minute; *Chrysochus auratus* 4 minutes; *Anomoglossus emarginatus* 1½ minutes; *Pieris rapae* ½ minure; House fly 25 seconds; *Strachio histrionica* ½ minute. These are given as few examples of comparison. Very often the bark seems to overcome to the last quiver of trophi and tarsi as quick as cyanide; but usually it takes double the time: thus with a larger locust *Caloptenus femur-rubrum*, Cyanide took 2½ minutes, and bark 5 minutes. This bark may merit trial as a practical insecticide for garden and farm. It is useless to kill flies caught in traps. It is here presented as preferable to Cyanide, for special uses. Cyanide potassa, or its acid, is the swiftest of all poisons, operative against vegetable, as well as all animated life, except the equine quadrupeds perhaps.

The Secretary called attention to the number of "*Gordius*" he had observed yesterday at the waters edge at the Falconwood Club grounds.

Prof. Forbes stated that e similar hairworm, *Mermis*, had undoubtedly lessened the numbers of grasshoppers in Illinois.

Mr. Ph. Fischer of Buffalo, exhibited a fresh specimen of *Catocala obscura* he had just taken, and observed it was the first record of its capture at Buffalo.

The President called attention to the unusual number of aphides in the State of New York, the present season, which had been more abundant than ever before observed by him; he had observed them on the Apple, black currant, tomato and potato, the latter more especially in the Eastern States; he had not hitherto noticed them on the tomato or potato. The Hop crop was almost a complete failure in New York State from the attacks of these peste.

Rev. C. J. S. Bethune, reported their prevalence in great numbers on the North Shore of Lake Ontario.

Prof. Forbes stated that his section of country was rather free from these pests.

Mr. Bethune asked if there was any affinity between the *Aphis* of the wild cherry and that of the hop.

The President stated that the European Entomologists had come to

the conclusion of the two forms were identical.

None of the members present had observed the aphides on the tomato or potato as reported by the president.

Mr. Ph. Fischer made some remarks on the probable identity of *Arctia rubricosa* Harris, with *A. fuliginosa* of Europe.

Mr. Reed asked for information on the best way of getting rid of Earth worms in lawn. Salt was suggested as the only remedy.

Prof. Forbes called attention to the fact of the Earth worm being the host of a Parasite that caused the "gapes" in chickens and being therefore injurious to fowls and poultry.

The meeting adjourned subject to the call of the President.

At 1.30 the same day the Club was driven out to Ebenezer under the guidance of the Buffalo Entomological Society; a most enjoyable time was spent; the locality is known as one of the best collecting grounds in the neighborhood: the club returned through the parks and appreciated most highly the hospitality of the Buffalo members.

Monday, August 23rd, 1886. The club met, pursuant to a call of the President at 9 A. M. The President in the chair. In the absence of the Secretary Mr. Reed, Rev. Raphael Benjamin, of Cincinnati, was chosen Secretary pro. tem. The following paper was read.

Vernal Habit of Apatura.

By Mary E. Murtfeldt, Kirkwood, Mo.

Prof. Riley's comprehensive papers on our two most prominent representatives of this genus of butterflies, as published in his 9th report on the Insects of Missouri, not to speak of the observations of other Lepidopterologists, leave few points in their history to be elucidated.

Almost the only blank remaining to be filled is that which exists from the time that the leaf, bearing the clusters of hibernating larvae, is wafted to the ground in the autumn, to the date in the ensuing spring when these larvae are found, generally more than half grown, feeding on the young leaves quite high up in the tree. This obscure part of their life history I have made several, only partially succesful, attempts to investigate.

Last autumn the larvae of *A. clyton* Bois. (A. herse, Fabr.) were unusually numerous on a young *Celtis* on our lawn. In many cases the entire under surfaces of certain leaves would be covered with the tiny larvae, stretched side by side in rank after rank from tip to base exciting astonishment and interest in all observers.

Wishing to keep track of them, and knowing that they seldom survived the winter in the rearing cage, I enclosed several of these colonies under muslin bags to twigs, a few only being placed in a cage indoors.

These immediately deserted the leaf, with the exception of about a dozen, and scattered over the cage attaching themselves in threes and fours to the wire-cloth covering and various parts of the framework.

The ensuing winter was exceptionally severe and an examination in March revealed the fact that all the larvae under muslin covers on the tree had perished and a large proportion of those in the cage had shared their fate, in spite of my utmost care.

In April when the leaves began to put forth I placed the leaf containing the few survivors on the ground near the base of the tree and secured it there. A few days later I was much gratified to observe that the little caterpillars had awakened from their winter nap and were slowly ascending the tree. Apparently they had not moulted immediately on arousing from dormancy, as no exuviae were found on the leaf. Expecting to be absent from home for a few weeks, I did not re-take any of these larvæ and of course soon lost track of them as they made their way up into the tree. Limited as this observation was it proved, what had heretofore been merely inferred, that some unerring and inscrutable instinct guides this small and feeble larva back to its fostering food plant in the spring, from whatever direction the leaf on which it hibernated had been blown. Undoubtedly many that survive the perils of the winter, perish on the vernal journey, although it is probable that the leaves bearing these dormant colonies being more heavily freighted than the others, are not born to so great a distance by the wind.

On my return home, about the first of June, I immediately made search for these *Apatura* larvæ, but was able to collect but three or four, nearly full grown, of *clyton* and two of *celtis*. Considering the vast numbers that were on the tree the previous autumn one is almost appalled at the waste of life permitted by Nature. The unusual severity of the winter may have been the cause of the remarkable scarcity of these butterflies in this locality the present summer. But in any case the lack of correspondence in numbers between the production and development of these butterflies suggests an ill adjustment to conditions of environment.

The President, remarking upon the interesting observations contained in the paper, stated that the butterfly had not to his knowledge been discovered in the State of New Yerk, although two localities for its food plant, *Celtis occidentalis* were known—the one upon the Hudson river, near Hudson, and the other, a solitary tree of large size on the line of the N. Y. Central & H. R. Rail-road, near Niles Hill in Montgomery County, which for many years had been an object of interest to travelers through the valley as "the unknown tree".

Some general discussion upon insects and their habits followed, when the club adjourned *sine die*.

Three new varieties, and one new species of Lepidoptera.

By Geo. D. Hulst.

Danais archippus var. fumosus var. nov.

I give this varietal name to the form of *D. archippus* which was in a number of specimens taken last year. It differs from the type form in having the whole of the surface of the wings which ordinarily is bright fulvous, of a deep sooty brown color.

Chrysophanus americanus var. fulliolus, var. nov.

A variety of this common species in which the coppery red is replaced by an equally glowing somewhat sooty yellow.

Artica phyllira var. **lugubris** var. nov.

Like *A. phyllira* on fore wings, but with hind wings unbroken black.

Platythyris floridana sp. nov.

Expands 25 mm. Head palpi and antennae brown. Thorax brown in front, reddish orange behind. Abdomen reddish orange with second segment brown. Fore wings dark reddish brown on inner two thirds except two reddish orange patches along inner margin, one basal, the other median. Outer third reddish orange, with a flexuous line of reddish brown running from costa across to outer margin at middle. Hind wings reddish brown, median band reaching from costa half way across wing. All reddish orange portions of all wings, reticulated with reddish brown. No hyaline spot on fore wings, but two small contiguous oval spots near middle of hind wings. Beneath as above with the colors somewhat darker and with a violet shading.

1 ♂, Fla. Coll. Doll.

Near *P. oculatana*, Clem. but differently marked on fore wings, and sufficiently distinct in having no hyaline spots on fore wings, and two on each of the hind wings.

NOTES AND NEWS.

Near the end of June 1886, when at Rockaway, L. I., I saw a fresh specimen of Papilio ajax on the wing. Insects boxes, and a lot of botanical specimens were dropped to the great amazement of passers by, a net whipped out from beneath my coat and thrust upon a cane, and a hot pursuit began. But the Butterfly rose over the "big hotel", and was seen no more!

I spoke of this occurence afterwards to some friends. Mr. Graef who was among them, said that some years ago he had taken a specimen on Long Island. Mr. Bruce, who was also present, said it is comparatively common in some parts of Western New York, where the Pawpaw, its food plant, is found.

The insect can as a consequence be credited to our State, as well as local fauna.

Geo. D. Hulst.

In the Ann. Soc. Ent. de France, 6 ser. t. 5me, p. 61, 1885. M. Leon Fairmaire describes the new genus HORNIUS for a cerambycid allied to the *Dorcasomides*. We have now *Hornia* among the Meloides, and *Hornius* among the Cerambycids: will somebody describe a *Hornium* among the *Carabids!*

Argynnis Diana, *Cram.*

This rare butterfly, the queen of its genus, is perhaps more common than is supposed, if only one knew where to find it, and collectors were willing to go after it. Mr. Evans, of Evansville, Ind. has at intervals found it comparatively common in that vicinity. The Rev. Dr. Chas. H. Hall of Brooklyn reports to me that he saw last year a considerable number flying at the base of Balsam Cave, Western North Carolina, and says that years ago he found it not uncommon at Asheville, N. C. A friend sending me some specimens, reported that in the year 1882 it was very common at Warren Springs along the French Broad. I found but 3 males at Waynesville, N. C. during August 1882. Mr. Aaron if I remember rightly, reported seeing it on the Tennessee side of the Mountains, and it is taken throughout Kentucky, and must be common in places. Those who know of local collectors, if there are any in those regions, ought to get a rich harvest of this insect. GEO. D. HULST.

Edgar, Freiherr von Harold died August 1st 1886, at Possenhofen, Bavaria. This removes from the ranks of the Entomologists one of the best known Coleopterists of our day. He is best known on this side of the Atlantic as the editor of the "Coleopterologische Hefte", as the author of monographs of Coprophagus Scarabidæ; but principally as one of the authors of the "Catalogus Coleopterorum hujusque descriptorum."

SOCIETY NEWS.

Brooklyn Entomological Society, Oct. 4, 1886. Mr. Weeks gave some of the results of his collecting notes and hints for collecting at this time of the year.

Nov. 2, 1886. Mr. Hulst referred to a request received from Mr. Scudder regarding the first appearance *of Pieris rapæ*. His recollection was that a Mr. Sachs had allowed imagines from some imported pupæ to escape from his attic window in Hoboken. Mr. Graef recalled having seen in print a statement that the insect was imported into Canada with a head of cabbage in 1863. Mr. Weeks stated that he had collected in the center of Long Island from 1861 to 1863 but never saw this insect, nor were there any in Tompkins Co. in 1869-70. In 1882, they were very common in Suffolk Co. L. I. The discussion turned upon the distribution of various insects through the transportation of the material upon which the larva feed. Mr. Linell had found in a Drug factory in Brooklyn specimens of a *Platydema* described by Dr. Leconte from a single Californian specimen. On motion it was resolved that hereafter some special orders or groups

be discussed at meetings, and for the next meeting members are invited to bring *Arctiidæ* and *Buprestidæ* for determination. Other families will also be named if presented.

Mr. Hulst stated that during the past summer he had made some observations upon the fertilization of yucca, in connection with *Pronuba yuccasella*, Riley. Prof. Riley, after many and extended observations, gave the history of the fertilization of this plant, concluding that the moth is a necessity to the continuation of the plant, that fertilization was effected by it alone, and that every developed seed vessel bore evidence of the work of the Moth by the presence of the larvæ within the capsule. The method of depositing the egg in the capsule, and of placing the pollen in contact with the stigma by the moth was, following Prof. Riley, given by Mr. Hulst. He stated that his observations did not bring him to the same conclusion as that arrived at by Mr. Riley.

1st. Honey bees were very plentiful about the flowers, very much more than the moth, and there was no doubt in his mind, that without any other agency than bees, there must be very extensive fertilization. There was no evidence of design on the part of the bees; simply a lighting at random upon any part of the flower, when this was open, and then a diving into the inner portion of the flower, to the base of the petals, passing over the anthers. Thus pollen would easily if not neccessarily be gathered on their legs, and the next flower visited would be fertilized. 2nd. The majority of seed capsules examined afterwards, showed no indication of larvæ of any sort present. Mr. Hulst spoke also of the fact that *yucca* was more or less fertile in foreign counties where it has been introduced, and where there was no evidence whatever of the presence of the moth.

Entomological Society of Washington. Meeting held November 12, 1886. Mr. Dodge gave some very interesting details regarding the life and work of the late Mr. Townsend Glover; how he had acquired a taste for entomology; his first attemps to picture and write about insects, his methods of work and taking notes and his many peculiarities. It appears that Glover had collected a vast amount of original observations on the life-histories of insects, especially in Lepidoptera and Coleoptera but that strangely enough he made in his publications hardly any use of his notes but preferred, wherever it was possible, to quote the "authorities". His notes to the extent of some twenty MSS. volumes are in the possession of the Smithsonian Institution and will probably never be published.

Mr. Mann reminded the members that after the death of Dr. F. E. Melsheimer in 1873 he had acquired the entomological manuscripts and library of Melsheimer including some MSS. of the elder Melsheimer, and the correspondence between Melsheimer and other entomologists of his day such as Say, Harris and Leconte. He exhibited a number of volumes from his collection. Some of these contain original descriptions, with colored figures, of larvæ (Coleoptera Lepidoptera) raised by Melsheimer, with notes on the habits of the larvæ etc. Another quarto volume contains a faunal list of Coleoptera (undoubtedly of Pennsylvania) with notes on food-plants, habits, time of appearance etc. of many species. Another literary curiosity exhibited was a copy of the rare Catalogue of the Coleoptera of Pennsylvania by the elder Melsheimer, published in 1806, with manuscript corrections and additions by the author, and his son.

Mr. Lugger presented a list of insects observed by him this year unusually late in the season. Of special interest among these is a female of *Mantis carolina* found in the Smithsonian grounds on November 11th, and a fresh specimen of *Cicada pruinosa* taken in the same locality on November 12th.

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New species of Geometridae, No. 3.

By Rev. Geo. D. Hulst.

Ephyra plantagenaria, sp. nov. Expands 21 mm. Palpi very short, black with scattered white scales becoming thus gray beneath; front black; thorax and abdomen light gray, the abdomen with indistinct annulations of lighter color, often white. Fore wings light gray, more or less overlaid with dark gray, forming indefinite lines and bands. The basal space is often dark gray, and the lines are three, each well determined on costa, indefinite, dissolving into the ground color as they cross the wings; the first is finest, the outer broadest, the latter band like with heavy cloud at middle and near inner margin, all very much angulate wavy across the wings. An indeterminate submarginal line or shading and a marginal line of black points; annulate spots faintly discerned on middle line. Hind wings like fore wings but wanting the first line; annulate spot faintly evident. Beneath, light cinereous with outer line evident, as also annulate spots.

7♂, 8♀, Tex. Ariz. Coll. Lintner, Neum. Hulst.

Acidalia obluridata sp. nov. Expands 19 mm., Palpi and head reddish brown; Wings whitish washed with light ochreous, which is somewhat darkened into cross-lines; over the wings is also a peppering of black scales, very much scattered but more numerous on the crosslines, and forming on fore wings a cloud at middle of outer third, and at inner margin, and on hind wings a somewhat distinct intra median line. On fore wings, the first line is basal, bent, the next extradiscal, oblique, and on the outer third, closely together and parallel, are three others, in part coalescing, dentate or wavy, showing white dentate space between; apart from the basal line the hind wings correspond; hind wings somewhat angled; discal spots small black; a row of black points on each wing just within margin, and an alternating row on fringe, faint; fringe light ochreous. Beneath whitish, without the ochreous tinge, and with the black run into the cross lines, which thus become quite marked especially outwardly.

1♀ Rockledge, Fla.. Coll. Hill.

Acidalia volucrata, sp. nov. Expands 19 mm. Palpi, head and thorax light ochreous, rather dull and blurred; abdomen same color, with a brownish cast

Fore wings, dull olive ochreous at base and for one-third the space of wings, then a purple brown band, slightly curved outward on inner side, with two deep sinuses on outer side; beyond rusty ochreous with a purple brown wavy dentate cross line at middle of space; a purple brown submarginal band, and a line of almost coalescing spots of same color, somewhat darker, rounded outwardly, just within margin. Hind wings olive ochreous washed with purple on inner third and rusty red outwardly, the purplish being most distinct on outer part of first and third, and forming an indistinct continuation of band on fore wings. Margin narrowly purplish brown. Beneath purplish ochreous, fringe purple, outer lines faintly evident, as also band on fore wings and discal spot on hind wings.

1♂, Mo. Coll. Mrs. C. H. Fernald.

Acidalia dataria, sp. nov. Expands 18 mm. Palpi and front snuff ochreous; thorax and wings light ochreous washed with snuff color; abdomen somewhat lighter; wings somewhat speckled with black scales, and with one broad even dark brown line in middle. A basal line of black points and also an outer one, the basal sometimes joined by a fine line, these lines present and continuous on the hind wings; a line of marginal black points also present on all wings; discal spots small, light ochreous, annulate with dark brown. Beneath light ochreous, the outer line of points showing, and joined in a fine dentate line.

2♂, 1♀, Cal., Coll. Neumoegen, Hulst.

Acidalia ancellata sp. nov. Expands 24 mm. Palpi ochreous, black at tip; front black; vertex, thorax, abdomen and wings light cinereous, abdomen somewhat annulate with dark gray. The wings are finely speckled with black points, giving a smoky cast to the wings; fore wings marked with three distinct lines, basal, extra discal and outer; the basal bent, the others oblique, straight, wavy, a little nearer together at costa than at inner margin; all lines are fuscous black, inclining to an ochreous tint sometimes; the outer one is very distinct and is heaviest. There are also submarginal clouded lines, wavy, and a line of marginal black spots, generally very sharp and distinct; discal spots black, distinct. Hind wings as fore wings except that the basal line is wanting. Beneath white, lines distinct; the surface, especially on the basal half, washed with smoky fuscous almost or quite covering the surface on the front wings. Legs cinereous blackish in front on fore and middle, all becoming sooty ochreous on tarsi.

2♂, 3♀, Sierra Nevada Mts., Cal. Ariz.

Close to *A. quinquelineata* to which in direction the lines very much correspond. But the wings are very much more pointed at apex, much more extended, much less rounded on outer margin.

Acidalia elimaria, sp. nov. Expands 31 mm. Tongue ochreous, palpi, head, body, and wings, pure white, wings rather silken and glistening; antennae dark fuscous very strongly pectinated; the fore wings are crossed by three fuscous lines, the two inner oblique, straight, the outer parallel with outer margin, none reaching costa; a faint submarginal line; margin narrowly fuscous. Hind wings without the basal line, middle line straight, outer slightly rounded, submarginal line distinct, margin fuscous. Beneath white, with lines faintly showing; margin fuscous, costa speckled with black. Fore and middle tibiae and tarsi fuscous or fuscous cinereous, hind legs with tibiae very long not very much swollen.

4♂, Col. Coll. Hulst. Near to *A. ordinata* Walk., differing in the

direction of the lines, and in various details of coloration and structure, but having much the same general appearance.

Acidalia quinquelineata, var. **fuscata,** var. nov. Differs from the type form in the more pointed fore wings, the more squammose vestiture, and the coloration which is smoky fuscous gray. It stands in some respects intermediate between *A. quinquelineata* and *A. ancellata.*

1 ♂, 1 ♀, Ariz. Col. Neumoegen, Hulst.

Eois hilliata, sp. nov. Expands 14 mm. Palpi and antennae brownish, thorax, abdomen and wings light brownish ochreous, fore wings narrow, extended though rounded at apex, each wing crossed by a distinct narrow unevenly scalloped plumbeous brown line; on the fore wings this line is very oblique with two considerable dentations inwardly. Beneath as above but with colors softened and lines indistinct.

1 ♂, Fla., Coll. Hill.

Eois bonifata, sp. nov. Expands 16 mm. Palpi and front dark brown; vertex, antennae, thorax, abdomen and wings light ochreous; abdomen becoming darker posteriorly; fore wings narrow, extended, with two black cross lines, one basal; rounded, somewhat angulated at middle, the other outer, pronounced at costa, rounded and rather faint across wings; on middle field, below discal spot is a cloud reaching to inner margin, on outer field, two faint clouded lines also a row of marginal cloudy spots; on hind wings the three outer lines, and marginal line are continued, rounded, parallel, wavy, with an inner shade within anal angle; discal spots distinct, black. Beneath lighter with a plumbeous shade, lines very faint, the outer black line most prominent on all wings.

1 ♂, Ariz, Coll. Neumoegen.

Eois labeculata, sp. nov. Expands 14 mm. Head, thorax, body and wings reddish purple. Discal spot on fore wings small, oval, ochreous yellow; a marginal band of same color on all wings, narrowed, almost divided by the purple color at middle of outer margin of fore wings, and on hind wings narrowing posteriorly, and becoming obsolete near anal angle. Below as above with band less yellow; fore and middle tibiae pinkish; hind legs and abdomen ochreous.

1 ♂, Ariz., Coll. Hulst.

Eois ferrugata, var. **russata,** var. nov. Differs from the type form in being of a rusty ochreous color; fore wings somewhat purplish at median crossline, and submarginally: middle field almost ochreous; outer line distinct, purple; margin purple; beneath, ochreous, lines faint.

1 ♂, N. Y., Coll. Hy. Edwards.

Eois eremiata, sp. nov. Expands 20 mm. Palpi and head rusty brown; thorax, abdomen and wings rusty ochreous; lines obsolete or very faint; when evident two in number, the one basal, strongly angulated, the outer bent, but nearly straight. Costa and margin pinkish; beneath ochreous, washed with pinkish, uniform in color.

2 ♂, Ariz., Coll. Graef, Neumoegen.

Eois subochreata, sp. nov. Expands 24 mm. Palpi ochreous brown; head ochreous; thorax and abdomen light ochreous; fore wings light ochreous, darker along costa; hind wings very light, almost white; all wings thinly clothed; fore wings with two lines, fine, indistinct, the basal wavy, some rounded; the outer wavy, nearly straight, nearer the inner angle than the apex; on hind wings a single faint line, wavy,

slightly rounded, extra discal; discal spots distinct on all wings. Beneath, uniform very light ochreous; lines and dots very faint.

1 ♂, Coll Graef.

Pigia multilineata, sp. nov. Expands 24 mm. Palpi, antennae and head light fuscous; thorax, abdomen and wings, smooth glistening white; costa, tinged with fuscous brown; fore wings with two groups of fuscous brown lines, all starting from apex; the first group consists of three lines, of which the inner is the darker parallel oblique, reaching inner margin at middle, the inner one extending across, hind wings near base; the second group consists also of three lines running slightly out from outer margin, the inner the heaviest, and the outer shading broadly towards margin; these continue as four across the middle of hind wing, the inner being replaced by two equally distinct; on the hind wings is an outer group of three corresponding lines, nearly straight, the outer shading gradually towards outer margin; on all wings a narrow fuscous margin; fringe white, fuscous stained outwardly; discal spots minute black; beneath as above lines more diffuse and indefinite with some black speckles basally and along costa.

3 ♂, 1 ♀, Ariz., Coll. Graef, Holland, Neumoegen, Hulst.

Phrygionis auriferaria, sp. nov. Expands 32 mm. Palpi, head, antennae brownish yellow; thorax and abdomen dull yellow; wings golden yellow; on the fore wing on inner two thirds are five lines of small purple spots, the first close to the base, the second and third extra basal, parallel near each other, waved, the outer two, extra discal, near together, parallel, bent outward twice; the spots are between the veins and each surrounds a small golden metallic spot, tumid in the larger ones, the outer third of the wing is much striated with purple, forming on its inner edge a purple band; hind wings with some purple striations on median space; on outer two thirds a purple line, shaded broadly inwardly with purple; this line includes three or four small golden dots; outer space purple yellow, with submarginal line of metallic gold, not tumid; ocellus just anterior to middle, along margin, purple red with metallic gold speckles, edged anteriorly with black: marginal line purplish red; fringes purple. Beneath uniform light ochreous; fringe purple.

1 ♂, Fla., Coll. Holland.

This is an exquisitely beautiful insect, and is one more form revealing the tropical character of the insect fauna of South Florida.

Semiothisa simulata, sp. nov. Expands 34 mm. Palpi fuscous, dark brown at tip; front ochreous brown; collar ochreous brown; front of thorax fuscous; posteriorly, and abdomen light ochreous fawn; wings very even light ochreous fawn, formed by a light ochreous base heavily but finely powdered with fuscous fawn; outer third fuscous fawn, straight margined on inner side, very even in color; discal points on fore wings, lengthened on hind wings, small; hind wings strongly angled. Beneath as above with the colors less even and the light ochre color less finely and completely powdered.

2 ♂, Coll. Graef, Hulst.

Very near *S. praeatomata* Harv. of which it is a possible variety.

Semiothisa metanemaria, sp. nov. Expands 29 mm. Head, antennae, thorax and abdomen light ochreous, the abdomen shaded with dark ochreous at middle of segments. All wings light ochreous, powdered with brown, the fore wings more finely and heavily than the hind wings. On the fore wings are two brown lines, the basal curved at costa, then straight, the outer slightly sinuate, the inner

outwardly, and the outer inwardly edged with white, the outer shading with brown gradually into subterminal space; outer edge falcate below apex, and marked there with a lengthened marginal spot of dark brown. Hind wings with a sinuate extra median line; all discal spots apparent, brown; hind wings strongly angulate. Beneath as above, with colorations generally more diffuse.

4 ♂, 4 ♀, Ariz., Coll. Graef, Holland, Hulst,

Resembles somewhat *Macaria tripliciaria* H. Sch.

Semiothisa mendicata, sp. nov. Expands 22 mm. Head ochreous; collar the same; thorax in front narrowly reddish ochreous, otherwise thorax, abdomen and wings soiled white; fore wings heavily powdered, outwardly some striated with dark brown, a basal line faintly indicated, also an outer line, rounded, sinuate, generally consisting of dark brown points on the veins; hind wings lightly powdered; the outer line faintly suggested; a narrow brown marginal line; all discal spots evident. Beneath as above, but with little powdering or striations; generally the base color is stained with reddish especially along costa.

2 ♂, 9 ♀, Ariz., Coll. Graef, Neumoegen, Hulst.

Semiothisa sublacteolata, sp. nov. Expands 24 mm. Palpi ochreous; head very light ochreous; thorax, abdomen and wings dull white; wings dusted with dark fuscous; two lines on fore wings, the basal faint, the outer bent below costa, then straight, both consisting of black points sometimes joined, outer space on all wings with a dark fuscous clouding; all margins with row of black points; extra discal line of hind wings evident but faint; all discal points distinct, black. Beneath whitish, heavily powdered and clouded with fuscous with a reddish tint; discal spots distinct, black.

2 ♂, 4 ♀, Ohio, Coll. Franck, Graef, Hulst.

Semiothisa tenebrosata, sp. nov. Expands 27 mm. Palpi, head and collar yellow ochreous. Thorax, abdomen and wings even close cinereous, with a dusting of light fuscous giving a smoky shade; the fore wings have three cross lines, the hind wings two, the outer two of the fore wings being continued on the hind wings; these lines are fuscous, fine, equidistant from each other; the first and third being as far distant from the base and outer margin as from each other; all fade away towards the costa. Beneath more coarsely striated, except that there are no striations on inner part of fore wings, while the hind wings have an ochreous tint. Discal spots wanting above, and on fore wings below; distinct, small, black on hind wings below; hind wings well rounded.

5 ♂, 5 ♀. Ariz., Coll. Holland, Graef, Neumoegen, Hulst.

Semiothisa umbriferata, sp. nov. Expands 28 mm. Palpi, head and antennae fuscous ochreous; palpi dark fuscous at tip; thorax and abdomen cinereous fuscous, wings cinereous, more or less washed with fuscous; fore wings with four lines, the first basal, straight; the next, the ordinary basal line, rounded; the next, more diffuse than the rest, just within discal spot, straight; the outer sinuate, strongly rounded outward from costa to vein 3; outer space washed and clouded with fuscous brown; a marginal line of black spots. Hind wings with the outer line of fore wings, an inner one faintly indicated. Margin fuscous brown with marginal, somewhat confluent, row of black spots; discal spots present on all wings, black; all lines somewhat diffuse; inner lines hardly evident; discal spots present.

1 ♂, Soda Springs, Cal. From Mr. Behrens. Coll. Hulst.

Semiothisa inquinaria, sp. nov. Expands 30 mm. Palpi fuscous brown;

head, thorax and fore wings bluish cinereous; abdomen fuscous cinereous, somewhat annulated with light cinereous; fore wings with a geminate band close to base, faint; three other bands, the middle broad black at costa, otherwise fuscous, even oblique; just within discal spot, straight till close to inner margin, then turning at a sharp angle outward; inner line strongly angulated from costa outwardly, till close to middle line then parallel with it, straight to inner margin; outer line geminate angulated outwardly below costa, then sinuate to inner margin; outer space clouded with fuscous; a row of marginal black points; hind wings yellowish cinereous except along inner margin where they are cinereous and powdered and striated with black; margin wavy black. Beneath fore wings cinereous, dashed with fuscous; costa and hind wings with an ochreous tint and striated with fuscous; discal spots above prominent, oval black, slightly pointed with cinereous within; beneath black points; fore wings in form strongly arched on costa, somewhat falcate, hind wings rounded with waved margin.

1 ♂, Cal., Col. Hulst.

Semiothisa octolineata, sp. nov. Expands 24 mm. Palpi and front dull ochraceous cinereous; fore wings with four ochreous lines; the first extra basal some bent; the second discal straighed; the third outer obtusely angled beyond discal, then straight; the fourth submarginal straight; fringe dark brown below apex to middle; hind wings with three outer lines; beneath ground color more ochreous than above and the lines much more pronounced and darker ochreous.

1 ♂, Ariz., Coll. Neumoegen.

The insect has on it Mr. Grote's label with the above name, but I am unable to find the description. and Mr. Grote is of the opinion he never described it. If Mr. Grote's description turns up the name will not have to be changed.

Semiothisa delectata, sp. nov. Expands 26 mm. Palpi, head and antennae ochreous brown; thorax, abdomen and wings even light ochreous cinereous; a single black lengthened spot at costa near apex; otherwise unicolorous with an ochreous tinge at base of fore wings; hind wings slightly wavy, with tendency to angulation at middle. Beneath as above, without the costal apical spots.

1 ♂, Col. Coll. Hulst; allied to *S. ocellinata,* Guen.

Semiothisa graphidaria, sp. nov. Expands 22 mm. Palpi ochreous fuscous; head fuscous in front cinereous at vertex; abdomen fuscous ochreous; wings white with dark fuscous shadings and black lines; lines are two, fine, black, the basal bent below costa, waved; the outer extra discal much bent from costa outward to beyond discal point then turning inward running nearly parallel with outer margin, wavy all the distance; the basal and middle fields are somewhat fuscous clouded and there is a fuscous band beyond outer line; discal spot black, and line of black marginal points; hind wings fuscous lighter basally and submarginally; lines of fore wing continued, but faint; beneath light cinereous, basal line heavy an both wings, black; a broad black band beyond outer line on all wings; discal points black.

2 ♂, 2 ♀, Ariz. Tex. Probably not a *Semiothisa* but placed here provisionally.

Marmopteryx morrisata, sp. nov. Expands 30 mm. Palpi very dark brown; head dark fuscous intermixed with black; thorax dark fuscous with collar and patagiae edged with black; abdomen ochreous brown; wings above and below fuscous, thinly scaled; above with color a little pronounced on sub-median vein, and

with two or three spots a little lightened along costa; fringes checkered with light ochreous. Beneath, fore wings with narrow black marginal line, hind wings with obscure black lining to anterior veins, but with a pronounced somewhat wavy black line running from middle of inner margin towards middle of outer margin. The appearance beneath is very like *Tornos*.

2 ♀. Ariz. Coll. Neum. Hulst. Named in honor of Dr. John G. Morris, one of the fathers in American Lepidopterology, who has been my kind friend, and whom, for his personal character and many sided erudition, I greatly venerate.

Marmopteryx annellata, sp. nov. Expands 37 mm. Palpi reddish brown; front fuscous black with some cinereous scales; antennae nearly white at base, soon by intermingling black scales becoming black outwardly; thorax dark brown: abdomen ochreous brown above near base, fuscous towards tip, and annulate with ochreous brown, cinereous below. Wings smooth fuscous with a chestnut violet tinge, which becomes decided on outer subcostal space and in apical region; on costa of fore wings are three brown spots, with ochreous between; from the second there goes to the center of the wing a brown rather diffuse band whith there rounds outwardly and returns to costa at third spot, taking thus a horse-shoe shape; fringes cinereous, black at end of veins on fore wings, interlined on hind wings with fuscous; beneath smoky fuscous on fore wings, along costa, and about apex, and on hind wings overlaid with a dusting of fine black and cinereous scales; horse-shoe of fore wings evident, but faint on inner side; a rounded angulated dark extra median line on hind wings; discal spots present on hind wings, white; fore legs cinereous, middle and hind legs fuscous, with some light scales.

3 ♂, 5 ♀, Pacific coast. Col. Neumoegen, Graef, Hy. Edwards, Hulst.

Thamnonoma fascioferaria, sp. nov. Expands 32 mm. Palpi, front, antennae, base of wings beneath, and legs bright yellow ochreous; thorax, abdomen and wings very light ochreous, the hind wings being almost white; fore wings slightly sprinkled with brown to cross band, somewhat more heavily sprinkled on submarginal space; on outer third is a broad dark brown band narrowest at costa, broadest on inner margin. Beneath yellow ochreous; band shown only by a costal and median spot; hind wings with indistinct extra median band; discal spots faint.

1 ♂, 1 ♀, Col. Coll. Lintner, Hulst.

Thamnonoma coortaria, sp. nov. Expands 28 mm. Palpi brown; head very light cinereous, antennae, thorax and fore wings light cinereous, the latter with a purplish tint; abdomen fuscous cinereous; the fore wings are somewhat powdered with black atoms; along the costa are four black spots, the second and third somewhat larger, and all more or less triangular; discal spots lengthened, black, just below second costal spot; ontwardly on submarginal space, the wings are broadly ferruginous, fading into the cinereous ground color; hind wings ochreous, except along inner border, were they are cinereous, striated with dark brown, discal spot black; the fore wings broad, rounded. Beneath, fore wings light fuscous ochreous; ochreous and striated with brown along costa; spots faint; hind wings light ochreous; ochreous along veins, strongly striated with ferruginous.

✓ 1 ♂, 2 ♀, Tex. Coll. Hulst. Nearest to *T. subcessaria*, Walk.

Lozogramma famulata, sp. nov. Expands 30 mm. Above dark fuscous; the abdomen narrowly annulate with light fuscous; the hind wings lighter towards base; discal spots black, diffuse, not very apparent; fore wings with a submarginal line of small white spots most feeble at middle, confluent near inner angle; hind

wings with a corresponding line, faint or obsolete anteriorly; beneath cinereous, heavily washed and clouded with fuscous; an extra discal sinuate darker line on both wings, outer line as above; marginal line very dark, discal spots a little more prominent than above.

1 ♂, Hamilton, Can. (J. Alston Moffat), Coll. Hulst.

This insect seems to be nearst *L. disconventata*, Walk.

Lozogramma graefiaria, sp. nov. Expands 36 mm. Antennae and head fuscous ochreous; thorax and abdomen same color, a shade lighter; fore wings light ochreous fawn with an olive tint; veins light ochreous; four brown marks along costa, the first basal, the second discal, the third further out, the three dividing costa into four nearly equal parts: the fourth is nearly apical, and is much the largest; a crossline starts from the first spot, faintly brown without, ochreous within, runs obliquely outward towards the middle of inner margin; there it bends, the ochreous portion touching margin, and returns, (as outer line), obliquely outward, reaching costa just within apex; on turning the brown comes on the inner side; wings quite falcate; hind wings lighter than fore wings, without lines; discal spots on all wings black, those on the fore wings especially prominent; beneath light even ochreous, discal points as above; the extreme apex of the fore wings black.

1 ♂, Ariz. Coll. E. L. Graef, for whom it is named. It is a curious insect in appearance, and I am uncertain under what genus to place it. I put it in *Lozogramma* provisionally, though it probably does not belong there.

Tornos candidarius, sp. nov. Expands 26 mm. Head ochreous; antennae white; body and abdomen white; wings silky white, unicolorous; beneath white, the hind wings slightly, the fore wings considerably washed with fuscous.

1 ♂, Ariz. Coll. Hulst.

Tornos rubiginosarius, var. **cinctarius**, var. nov.

Palpi and antennæ black; head, thorax, body, and wings reddish brown; fore wings with three black lines, the basal rounded, wavy, distinct; the middle intradiscal, faint except at costa, rounded; the outer extradiscal, distinct, sharp, rounded above the large black discal tuft, then bent to inner margin; outer space with a submarginal line of small rather indefinite white spots; a dark cloud at inner angle; hind wings with oval black discal spot and rounded sinuate extradiscal black line; beneath as above, but with color lighter, and lines much fainter.

Tornos rubiginosarius, var. **abjectarius**, var. nov. This is in color a dark smoky brown, almost uniform on thorax fore and hind wings to the submarginal space, and there some darker, but even; discal dots on fore wings black, a submarginal row of faint light colored spots, and the marginal line black, broken; abdomen with a dorsal row of black spots.

Tornos dissociarius, sp. nov. Expands 38 mm. Palpi black; head cinereous; collar black; thorax smoky cinereous; abdomen light cinereous on first segment, this followed by a jet black line, the rest fuscous; fore wings fuscous cinereous, washed somewhat with dark fuscous and blackish; two narrow black lines start very obliquely from the inner margin near the base, and run with an uneven waviness towards a point on the outer margin just above the middle, then turn back before reaching the margin, and forming a deep rounded sinus reach the costa not far from apex; the lines are very near each other, and closely parallel; hind wings light cinereous except submarginally, where it is concolorous with the fore wings; from the middle of the inner margin, two parallel black lines run, the outer heavier, which fade away near the middle: beneath light even cinereous; costa of fore wings darker, and lines on hind wings faintly seen.

Synopses of Cerambycidae.

By Chas. W. Leng, B. S.

(Continued from p. 103.)

ISCHNOCNEMIS, *Thom.*

Contains also one species.

I. bivittatus Dup. Mag. Zool. 1838 Cl. IX. p. 58, t. 220. f. 1.; Klug. Dej. Cat. 3 ed. p. 346. Guer. Ic. t. 45. f. 9; *argentatus* Chev. Dej. Cat. 3. ed. p. 346; *bilineatus* Gory. Guer Ic. Règn.Anim. III. p. 250, Gray. Griff.Anim. King. t. 95. f. 9; Castln, Hist, Nat. II. 490. t. 34, f. 9.

Length .36–.52 in.=9–13 mm. Hab. Texas to Arizona.

Resembles the preceding in coloring but the golden hair on the thorax is arranged in a broad line on each side; the median space is punctured and the external vitta is not abbreviated. The antennae in both genera are as in *Sphaenothecus*.

STENOSPHENUS, *Hald.*

A very complete paper by Dr. Horn will be found in Trans. Am. Ent. Soc. XII. p. 177--180. We give merely the Synopsis and Bibliography.

Thorax wider than long, not narrowed at apex;
  Thorax reddish with a discal black spot.....**notatus.**
Thorax as long or longer than wide, narrower in front.
  Punctures of elytra separated by three longitudinal smooth intervals;.....**lugens.**
  Punctures of elytra dispersed;
    Thorax red, elytra black;
      Femora red;
        Thorax oval, not longer than wide, punctures numerous; elytra very obliquely truncate, the outer angle spiniform,.....**novatus.**
        Thorax oblong, longer than wide, punctures few and inconspicuous; elytra sinuously truncate, angles not spiniform,..... ..... **lepidus.**
      Femora black;
        Thorax oval, very nearly smooth; elytra less obliquely truncate, the angles sometimes spiniform,.... ....**dolosus.**
    Body and legs pale brownish testaceous;
      Thorax coarsely punctured, a median smooth space only; elytra obliquely truncate, both angles subspinous..... **debilis.**

S. notatus Oliv Ent. IV. 1795, 70, p. 61., t. 7. f. 89; Hald Trans. Am. Phil. X. p. 39; Lec. J. A. P. ser 2. II. p. 12. *deflendus* Newn Ent. p. 6; *discicollis* Dej. Cat. 3. ed. p. 355; *discoideus* Sturm Cat. 1826 p. 199.

Length .35--48 in. 9=12 mm. Hab. Atlantic States.

S. lugens Lec. Proc. Ac. Phil. 1862 p. 41;

Length .48 in.=12 mm. Hab. Texas.

This species is colored like the following.

S. novatus Horn Trans. Am. Ent. Soc. XII. 1855 p. 179.

Length .38 in.=9.5 mm. Hab. Lower Cal.

This is the species which occurs in our lists as *cribripennis* Thom.

S. lepidus Horn. L. c.

Length .38 in.=9.5 mm. Hab. Arizona.

S. dolosus Horn. L. c.

Length .27--.42 in.=7--10.5 mm. Hab. Southwestern Texas.

S. debilis Horn. L. c.

Length .30--.36 in.=7.5–9 mm. Hab. Utah.

S. sobrius Newn (Elaph.) described erroneously from U. S. is a Mexican species.

CLYTINI.

The characters separating this tribe are discussed in the "Classification." It is sufficient to say here that they are all easily recognized by their resemblance to a few abundant species represented in every cabinet.

For the assistance of the student the various structures whose differences serve to separate the groups and genera are figured.* Also the frontal carinæ of all the species of *Xylotrechus*. This feature is best seen by holding the insect with the front uppermost. Then under a glass of very moderate power it will be seen as an elevated ridge, quite smooth, starting below the eyes and running to a little past them, and dividing at about the middle of its length into two lines diverging towards the sides of the head. The species to which this description does not apply are *nitidus*, *4-maculatus*, and *convergens*. In these there are no diverging lines and the division is only represented by an impressed space more or less extensive. In *planifrons* there is no carina at all and I have therefore placed it in *Clytus*. With this explanation I think the synopses will be easy to follow.

Whatever completeness this paper may have is largely due to the kindness of my friends in allowing me to use their material and I take great pleasure in returning my thanks to Dr. Horn, the National Museum at Washington, and Messrs. Smith, Julich, Roberts, Ricksecker and Welles and to Mr. Samuel Henshaw I am again indebted for a careful revision of the list of habitats.

The genera are divided as follows.

Epimera of metathorax produced over the angles of the 1st ventral segment, so as to enclose the hind coxæ externally;

Front short, intercoxal process of 1st ventral segment rounded..*Group* **Cyllenes.**

Front large, process acute.....*Group* **Clyti.**

Epimera of metathorax not produced, episterna linear; front large, intercoxal process acute,.....*Group* **Anaglypti.**

Cyllenes.

Mesosternum usually convex in front, prosternum perpendicular at tip.

Pronotum transversely excavated at sides near the base,.....**Cyllene.**

Pronotum not excavated,.....**Trichoxys.**

* The plate will accompany a future number.

Mesosternum oblique or nearly flat, prosternum declivous at tip, not perpendicular. pronotum not excavated, but only rounded and constricted at base.
Antennæ compressed, subserrate,..... .....Plagionotus.
Antennæ filiform.
Mesosternum declivous,.. ....Calloides.
Mesosternum nearly flat, episterna narrower,.....Arhopalus.

These genera contain but few species easily known by the markings.

Clyti.

Episterna of methathorax wider;
Head not carinated; pronotum without transverse ridges..... Clytus.
Head carinated;..... .....Xylotrechus.
Head not carinated; pronotum with transverse ridges;
Antennae 11-jointed..... .....Neoclytus.
Antennae 12-jointed.....Euryscelis.
Episterna of metathorax narrower,..... Clytanthus.

The thighs are spinose only in *Euryscelis* and part of *Neoclytus*. The thorax of *Xylotrechus* is usually without ridges, in one species however the ridges are indicated and sometimes quite well developed. The two species of *Clytanthus* are easily known by the markings. They have neither the thoracic ridge nor the frontal carina.

Anaglypti.

Elytra without ivory bands;
Eyes oblique, emarginate;
2nd joint of antennae ♀ as long as the 4th; antennae not spinose, Microclytus.
2d joint of antennæ ♀ ♂ short as usual.
3d joint of antennæ spinose,..... ... .Cyrtophorus.
Eyes rounded, entire,.....Tillomorpha.
Elytra with ivory bands,..... .....Euderces.

The form of the eye is figured for each of these genera. *Tillomorpha* has it smaller as if the upper emarginate part had been cut away, and it is nearly round and without any break in its contour.

The discovery that *Microclytus* ♂ lacked the peculiar form of antennæ described in the "Classification" p. 305 (the 2d joint in that sex being as short as usual) required the slight change in the characters used in separating the above genera.

CYLLENE, *Newm.*

We copy the synopsis by Dr. Horn in Trans. Am, Ent. Soc. VIII. p. 134.

Antennæ with joints 3–5 spinous at tip;
Thorax and abdomen uniformly pubescent;prosternum wide between the coxae but not prolonged; tip of elytra acutely spinous,.....antennatus.
Antennæ not spinous; thorax black with yellow bands, abdomen more densely pubescent at sides, feebly at middle;

Prosternum wide between the coxæ, dilated at tip and more or less emarginate, prolonged and meeting the mesosternum and slightly overlapping it;
Elytra acutely prolonged at tip,..... .....**crinicornis.**
Prosternum moderate, not prolonged; elytral tip truncate;
2d joint of hind tarsus glabraus at middle, antennæ of ♂ longer than body; prosternum between the coxae longer than wide,..... .....**pictus.**
2d joint of hind tarsus densely pubescent; antennæ not longer than body;
Prosternum rather widely separating the coxæ, being as broad as long and as wide as the coxal cavity..... .....**robiniæ.**
Prosternum longer than wide, not as wide at its middle as the coxal cavity,..... ....**decorus.**

C. antennatus White. Longic. VIII, 2, 1855, p. 252; *eurystethus* Lec. Proc. Ac. Phil. 1858, p. 82; Arcan. Nat. 1859, p. 127, t. 13, f. 9.
Length 15–20 mm.=60–80 ins. Hab. Arizona, Sonora. California.

Color light reddish brown or nearly black with pubescent bands of lighter color more or less obliterated. Lives in Mesquit wood.

C. crinicornis Chev. Mon. 1860 p. 460: *sanguinipes* Dup. Dej. Cat. 3 ed. p. 356; *similiguttatus* Chev. Mon. 1861 p. 380.
Length 10–20 mm.=.40–.84 in. Hab. Cal., Mexico, Arizona, Texas and Louisiana.

This is the species which formerly appeared in our lists under the name *erythropus* Chev. The species to which that name rightfully belongs has not yet occurred north of Mexico. It resembles *crinicornis* in the sudden constriction of the thorax but differs in the prosternum which in *erythropus* is similar to *pictus.*

C. pictus Drury Ins II. 1773 Ind.; I. p. 91. t. 41 f. 2; Lec. J, A. P. sec. 2 II. p. 177; Harris Ins. of Mass. p. 85; Osten-Sacken Proc. Ent. Soc. Phil. I. 1862 p. 121. t. 1. f. 7.
Length 12-20 mm.=42–89 in. Lives in Hickory wood and appears early in Spring and is abundant wherever that tree occurs.

C. robiniæ Forst. Nov. Spec. Ins. 1771 p, 43; Lec. J. A. P. sec. 2 II. p. 17; Walsh Proc. Ent. Soc. Phil. 1866 p. 204; *flexuosus.* Fab. Syst. Ent. p. 191; Lap. and Gory Mon. p. 13 t. 4. f. 14 t. 1 f. a.
Length 12–20 in.=48–80 mm. Hab. Infests Locust wood and appears in Autumn.

The much greater length of the antennae and posterior thighs will assist in separating pictus ♂ but the characters of the table are all that apply to the ♀ and I have seen a specimen taken by Mr. Welles near Chicago in which the tarsal character appeared to be lacking. The two species are very closely related.

C. decorus Oliv. Ent. IV, 70 p. 63, t. 8. f. 92; Lap. and Gory Mon. p. 14, t. 4, f. 15; Hald. Trans. Am. Phil. X, p. 39; *charus* Say. Bost. Journ. I, 1835, p. 193; Lec. J. A. P. ser. 2, II, p. 17; Col. of Kans. 1859, p. 20, t. 1, f. 16. var.; *infaustus*

Lec. J. A. P. ser. 2, II, 1850, p. 17; *brevipennis* Lec. S. M. C. 1873, XI, p. 197; *lutosus* Lec. Proc. Ac. Phil. 1861, p. 356.

Length 12–20 mm.=48–80 ins. Hab. Southern States to Kansas and Colorado Mont. Ill. Ind. Iowa Mo.

Dr. Horn says in reference to this "An extremely variable species which, with the mass of material before me, is not capable of division."

Of the synonyms named above *brevipennis* was applied to a very fresh specimen with soft abdomen, *lutosus* to one with elytra entirely yellow and the others to the different forms which commonly occur and we figure the arrangement of bands in each.

The colors are yellow and black.

TRICHOXYS *Chev.*

T. Hartwegi White. Longic. VII, 2, p. 252, t. 6, f. 8; Luc. Ann. Fr. 1857, Bull. p. 48, ♀.

Length 22 mm.=.88 ins. *Hab.* Arizona.

Color black, elytra with reddish gray and white bands; easily known by the peculiar arrangement of elytral bands.

PLAGIONOTUS *Muls.*

P. speciosus Say. Am. Ent. III, 1828, t. 53; Lap and Gory Mon. p. 39, t. 8, f. 48; Lec. J. A. P. ser. 2, II, p. 17; Harris. Ins. of Mass. p. 84.

Length 23 mm.=.92 ins. Hab. Can. Vt. Mass. N. H. Pa. L. Sup. Me.

Black with yellow bands.

CALLOIDES *Lec.*

Contains two species very closely allied.

Elytra with a vague depressed transverse band,..... **Lorquinii.**
Elytra without band,.....**nobilis.**

C. nobilis Say. Harris Hartf. Trans. 1836, p. 84, t. 1, f. 7; Lec. J. A. P. ser. 2, II. 1850 p. 18; Lacord. Gen. Col. IX. 1869, p. 64 not 3.

Length 20–23 mm.=.80–.92 ins. Hab. U. S. Brown or black, elytra generally marked yellow as in figure but sometimes immaculate.

C. Lorquinii Buq. Ann. Fr. 1859, p. 629.

Length 22 mm.=88 ins. Hab. California.

Black without markings. It scarcely differs from the preceding except in the elytral depressed band. There is a difference in thoracic sculpture, difficult and misleading to describe.

ARHOPALUS *Serv.*

A. fulminans Fabr. Syst. Ent. p. 192; Lap and Gory, Mon. p. 35, t. 8, f. 44.

Length 12–18 mm.=48–72 ins. Hab. U. S.

Black with white pubescence.

CLYTUS *Laich.*

This genus as here restricted contains only those species without either narrow episterna, frontal carina or thoracic rugae. I have included *planifrons* because that species presents none of the characters used

in the classification to separate *Xylotrechus* from *Clytus*. Dr. Leconte in ascribing it to the first was guided by the flat front which is like that genus.

SYNOPSIS OF CLYTUS.

Front more elongate flat;
Elytra black with yellow bands..... **planifrons**
Front less elongate, depressed at middle;
Elytra pale at base, otherwise black with yellow transverse bands.... **marginicollis.**
Elytra black with sutural and partial transverse bands..... **lanifer.**

C. planifrons Lec. Trans. Am. Ent. Soc. V. 1875, p. 67.
Length 7½ to 13 mm.=30–52 ins. Hab. Cal., Nev.

This species shows no variation in coloring except in the enclosed line which usually transverse is sometimes oblique and the specimen then very closely resembles *X. insignis* from which it may be distinguished by the absence of the frontal carina, the greater length of the posterior femora, and by the absence of yellow hair on the elytra each side the scutellum.

C. marginicollis Lap and Gory. Mon. p. 41, t. 9. f. 50; Lec. J. A. P. ser. 2, II, p. 26; *vespoides* Hald. Trans. Am. Phil. X, p. 40; Dej. Cat. 3 Ed. p. 356.
Length 8 to 10 mm.=.32 to .40 ins. Hab. Mass. Ga. Pa. Nev.

C. lanifer Lec. S. M. C. No. 264, 1873, p. 198.
Length 9 to 14 mm.=.36 to .56 ins. Hab. Cal. Ariz.

The abundance of yellow hair gives this species a distinctive woolly appearance from which it derives its name. The three transverse yellow bands are variable in length being usually mere spurs from the sutural band.

XYLOTRECHUS *Chev.*

By the omission of *planifrons* this becomes a perfectly defined genus, including all the Clytini with the front of the head carinate. The species may be separated as follows:

SYNOPSIS OF XYLOTRECHUS.

Frontal carina reduced to an elongate space, scarcely divided; surface shining..... **nitidus.**
Frontal carina a narrower elongate space, divided or impressed longitudinally;
Thorax with four pubescent spots, elytral pubescence white, inconspicuous..... **4-maculatus.**
Thorax marked with lines, elytral pubescence yellow; the lines connected at suture, **convergens.**

Frontal carina V or Y shaped;
Elytra at apex obliquely truncate, the outer angle spiniform;
Sides of thorax regularly arcuate,..... **sagittatus.**
Sides of thorax suddenly obliquely narrowed at basal third..... **nauticus.**
Elytra at apex obliquely truncate rarely (*colonus*) subacute externally;

Thorax without apical and basal margin of paler pubescence;
Sides of thorax regularly arcuate,.....**colonus.**
Sides of thorax suddenly obliquely narrowed at basal third,....**annosus.**
Thorax margined at base and apex with yellow or white pubescence:
Median elytral band more or less angulate or undulatory; the humeral band when present short and transverse.....**undulatus.**
Median band regularly arcuate;the humeral band always present and very oblique,.....**obliteratus.**
Elytral apices separately rounded,.....**mormornia.**

Most of the species are easily recognized; the frontal carina of *nitidus* is distinctive, *4 maculatus*, *convergens* and *obliteratus* have distinctive markings, *sagittatus* is the only species with well developed spines on elytral tips, *colonus* alone possesses bands as broad as the intervals between them. The others are described in detail below.

X. nitidus Horn Ac. Phil. 1860, p. 572, t. 8, f. 2.
Length 12 mm.=48 ins. Hab. N. J., Pennsylvania, Texas.

Black, shining, with narrow yellow margins. Legs testaceous, hind thighs darker at tip. Beneath spotted and banded with yellow. The enclosed mark is an oblique line, directed towards suture.

X. 4-maculatus Hald. Trans. Am. Phil. X 1857, p. 41; Lec. J. A. P. ser. 2 II, p. 29.
Length 8-12 mm.=.32-48 ins. Hab. Eastern and Middle States.

Black or light brown, elytra in black specimens mostly brownish. Thoracic spots usually very distinct, elytral markings white, a few scattered hairs and lines, scarcely visible. Mr Wenzel tells me this species is taken by beating the Black Alder.

X. convergens Lec. S. M. C. 1873, p. 198.
Length 8–11 mm.=.32–.44 ins. Hab. Ohio, Iowa.

Black or fuscous, thighs pale at base pubescent beneath and bands above narrow yellowish white. The thoracic spots resemble 4-*maculatus* somewhat but are nearly connected. Five specimens show no variation except in size.

X. obliteratus Lec. S. M. C. 1873, p. 199; *insignis* Lec. (♀) l. c.
Length 11--20 mm.=.44--80 ins. Hab. Colorado; California.

Black or brown with broad yellow bands on the elytra, following the usual pattern, and margining the thorax. In the ♂ the middle band is usually entirely obliterated. In two specimens before me also males the bands are partly obscured by a sprinkling of cinereous pubescence indicating that the species may vary quite as much as *undulatus*. All the females I have seen are constant in marking. For the synonomy my above I am indebted to Messrs Ricksecker and Rivers. Mr. Ricksecker

sent me ♂ ♀ originally as such and Mr. Rivers has succeeded in obtaining and mating freshly hatched specimens. This species is rare in collections partly from its being frequently confused with *C. planifrons* from which it may be easily known by the frontal carina and by the pubescence at the scutellum. In *planifrons* the scutellum only is covered with yellow pubescence, while in *obliteratus* the base of the elytra also is densely clothed for some distance on each side.

X. sagittatus Germ. Mag. Ent. IV, 1821, p. 171; Lap and Gory Mon. p. 82. t. 15. f. 95; Lec. J. A. P. ser. 2, II, p. 177; *pubescens* Hald. Trans. Am. Phil. X, p. 40; Lec. l. c. p. 28; Dej. Cat. 3 ed. p. 356.

Length 15–18 mm. =.60–.72 ins. Hab. Florida, Georgia, Pennsylvania, Michigan, Mass. Ariz.

Brownish. above and beneath with more or less white pubescence and indistinct bands. The spines of elytral tip though short are distinct and more marked than in any other species.

X. mormonus Lec. Proc. Ac. Phil. 1861, p. 357.

Length 15–17mm.=.60–.68 ins. Hab. Utah, Wis.

I have seen but one specimen in Dr. Horn's collection corresponding exactly with Dr. Leconte's description as under.

"Black, sparsely cinereo-pubescent, head rough marked with two "frontal carinæ thorax oval, wider than long, convex, rough, elytra feebly "punctured and rugose, separately rounded at apex, with several small "pubescent spots in middle fascia and another at two-thirds the length "denuded, posterior femora a little shorter than the abdomen."

X. colonus Fabr. Syst. Ent. p. 91; Oliv. Ent. IV, 70, p. 31, t. 6, f. 67; Schönh. Dej. Cat. 3, ed. p. 356; Lec. J. A. P. ser. 2, II, p. 28; *campestris* Oliv. l. c. p. 65, t. 8. f. 95; Lec. l. c. p. 27; *coloreus* Fabr. Syst. El. II, p. 345,(err. typ.); *scabricollis* Mergerle, i. litt.; *terminans* Fabr. Ent. Syst. Suppl. p. 151; Lap and Gory Mon. p. 83, t. 15 f. 96; *villicus* Oliv. l. c p. 64, t. 8. f. 94.

Length, 8–16 mm.=.32–.64 ins. Hab. U. S. east of Rocky Mountains.

Black or brown pubescent above and beneath with lighter hair. The markings are very variable but the yellow wavy line running from suture and forming the included mark seems to be constant and peculiar to the species.

X. undulatus Say. Long's Exped. II. 1820, p. 291, Am. Ent. III. 1828, t. 53; Lap and Gory Mon. p. 57, t. 11, f. 66; Lec. J. A. P. ser. 2. II. p. 27; *undatus* Kirby Fn. Bor. Am. IV. p. 175, t. 7, f. 5, *integer* Hald. Trans. Am. Phil. X, p. 41; *lunulatus* Kirby l. c. p. 175, Hald. l. c. *Sayi* Lap and Gory Mon. p. 55, t. 11, f. 64, Hald. Proc. Am. Phil. Soc. IV, p. 372, *var. fuscus* Kirby l. c. p. 176. Lec. l. c. *var. interruptus* Lap and Gory l. c. f. 67.

Length 11–21 mm.=.44–.84 ins. **Hab. U. S.**

(To be Continued.

Pleocoma Fimbriata, *Lec.*

That the species of Scarabaeidæ are not numerous in California may partly be due to the long continued drouths, occuring annually, from the end of May to about the 10th of October, during which time the surface is baked into more or less hardened crust through which the larger Scarabaeidae would find it very difficult to emerge. *Polyphylla decemlineata* Say, frequenting the vicinity of large oak and other forest trees, and *Amphicoma ursina* Lec., breeding in the shifting sea-sands, avoid this difficulty, but it is in *Pleocoma* that we get the happy illustration of the old proverb, that "all things come to him that waits". They wait until the first autumnal showers soak the earth to the depth of four or six inches, when they quickly emerge. Their flight is diurnal and of very short duration, lasting a day or at most two days. Probably no single individual remains on the surface more than a few hours and many disappear again in the earth after a few minutes flight. In this lies their safety, otherwise their size and awkwardness would render them an easy prey to those omnivorous devils, the Stellars and California Jays, which are everywhere abundant and always ready to gobble up a helpless insect, rob the nests of other birds, or depredate the vineyard or cornfield.

The locality where a brood of *Pleocoma fimbriata* was observed by me in 1885, when I took three males, and again this autumn, when about a dozen were secured, is a series of barren hills that are excessively rocky and overgrown by low, scrubby bushes; chief among them being the common Manzanita, upon the roots of which I suspect the larvae will be found to feed. The flight of the males is low and heavy, seldom attaining a height of more than six or eight feet and their progress is slow. Alighting clumsily on a low bush and tumbling to the ground, they at once hunt for a soft spot, commence to burrow and quickly get out of sight. All this applies to the males only, which are totally black and shining. I have succeeded in capturing but one female, which is brown and much more convex than the males and is without wings. She was found about four inches below the surface, with three males in the same burrow, following her and fighting each other vigorously.

The union of the sexes being, seemingly the only object of their appearance above ground, it is a question wether the apterous females ever entirely emerge, or perhaps only approach the surface, from below, where the flying males discover them by some acute sense and dig down to find their mates. However that may be, this much is certain that the whole brood makes its appearance on the next day after the first soaking showers in October. On the following day a few stragglers only will be seen, and after that a single individual,—late and disappointed,—may be found, once in a long while, but the probabilities are greatly against

seeing any, whatever, after the second day of their appearance. I watched very carefully, nearly all of the third day, in the best locality known to me, without seeing one, although the weather was favorable.

Some young men living near by were quite familiar with the "bugs" and had noticed them for some years. These I hired to watch this years' brood for me, and on the first day after the rain of October 16th they saw numbers of them, but being in hot pursuit of a deer and having no convenience for "bottling bugs", they failed to augment my collection. However their observations are good, in that they corroborate my own about the sudden appearance and disappearance of the whole brood, and they also informed me they had never seen a *Pleocoma* fly in the open pastures or cultivated lands, contiguous to the hills where the brood occurred.

Further observations, upon next years' brood will, I hope, enable me to throw more light upon the habits of this interesting beetle,

L. E. Ricksecker.

Fall Collecting of Hymenoptera from Solidago sp and its Results.

By C. L. Marlatt, Manhattan, Kan.

The following results were obtained by sweeping the bloom of two or three species of *Solidago*, notably *S. rigida* and *S. speciosa*, var. *angustata*, one hour or so a day during the last week of September and the first of October.

The plants in question grew along the sides of a grassy ravine left uncut by the hay makers, and of them, *S. rigida* was the most abundantly represented and yielded the best returns. *Solidago speciosa*, var.. bloomed somewhat later and seemed to be an especial favorite of various species of *Bombus* and *Apathus*.

The prevailing south-west wind of this season was blowing, and, by beating against it proved to be an efficient aid in collecting, both by driving the insects the more readily into the net, and also in preventing the flight of many of the shyer forms that in a calmer season would have been with difficulty approached.

The insects on plant after plant were driven into the net by quickly beating the flowers; the wind and the quick movements of the net preventing their escape till a sufficient quantity was secured, when a few quick motions of the net drove them to the bottom.

Seizing the net just above the seething mass of insects and with the aid of forceps thrusting the end of the net and its contents bodily into a wide-mouthed collecting bottle ensured the retention of all taken. A few seconds in the bottle stupefied the "catch", and it could be removed

and examined at leisure, transferring what was of value to another collecting bottle.

Following up this method, I was enabled to fill two large collecting bottles in less than one hour with selected specimens.

Each examination of the net's contents showed some rare and frequently new form of Hymenoptera or Diptera; and in place of the similarity looked for, each succeeding day introduced new forms frequently in abundance where none had been seen on the day previous. The order Hymenoptera was chiefly represented, the flowers of a single plant frequently containing 5 or 8 *Ammophilas* 15 or 20 bees of the genus *Augochlora*, *Agapostemon* and others, together with representatives of half-a-dozen other families.

The lateness of the season, several heavy frosts occurring before and after the period, may make a statement of the number of forms represented in the Families of aculeate Hymenoptera of interest.

The numbers do not indicate distinct species in every case, a few will doubtless prove to be male and female of the same species on further examination.

Formicidae, 3. *Chrysidae*, 2. *Mutillidae*, 2 ♂. *Scoliadae*, 2. *Pompilidae*, 10. Sub. fam. *Larrinae*, 6. Sub. fam. *Spheginae*, 15, (12 species of the genus *Ammophila*). Sub. fam. *Bembecinae*, 2. Sub. fam. *Philanthinae*, and *Crabroninae*. 20. *Vespidae* 27. of which 23 are of the sub. fam. *Eumeninae*. *Apidae*, 50-.60.

The smaller forms of Hymenoptera were well represented; many large and handsome Dipters were taken; and the orders Hemiptera and Coleoptera, yielded numerous species. In all, several thousand specimens were thus secured.

The writer has not before found a spot yielding such rich returns at this season, doubtless accounted for in the fact that this was the only patch of fresh blooming plants of the species given, or indeed of any species, in this locality.

Collecting Notes: Many handsome Ichneumons and several species of Cynipidae were secured in this and previous years by beating the aftermath in grassy ravines with a collecting net.

SOCIETY NEWS.

Entomological Society of Washington. December 2. Prof. Riley read a paper on the luminous larvae which are now recognized as the larvae and larviform females of *Phengodes* and *Zarhipes*. After reviewing the literature on the subject he stated that he first found one of these larva in 1869 in a cellar at St. Louis, Mo., and the figure he made of this larvae is published in LeBarons' 4th Illinois Report. Subsequently he received quite a number of similar larvae

from various parts of the country, and upon examining this material he finds that the larvae essentially agree in structure but that they are divisable into three groups according to the different coloration of the dorsal surface. An hitherto overlooked peculiarity of these larvae is the presence of two pairs of dorsal spiracular orifices situated in the sutures between the 4th and 5th, and between the 5th and 6th segments. A much smaller larva from Nevada lacks these spiracular apertures and differs moreover by having a large ocellus on each side of the head. The only observable difference between those specimens which from their size were supposed to be female beetles and those which are undoubtedly larvae is in the darker, more chitinized mouth-parts and legs of the supposed females, but none of these showed upon dissection traces of unquestional eggs. — A long discussion in which most of the members present participated followed on various topics connected with this *Phengodes* question. Mr. Smith related his observations on one of these larva which he had received from Connecticut: Mr. Mann spoke on the habits of the numerous specimens he found in Massachusetts and on the character of their luminosity; Mr. Schwarz related his experience in finding a number of male *Phengodes* in Florida in day time and gave a review of the geographical distribution of the Phengodini of North America.

Mr. Schwarz exhibited samples of small square rods of naphtaline which, under this form, is known in commerce as "carbon" and used for intensifying the light of gas flames. It is extremely cheap and very pure. When broken up in smaller pieces and wrapped in thin paper it can be most conveniently used in insects boxes.

Dr. Marx presented a short analysis of his work on the North American *Scorpionidal* which is nearly ready for publication and which is based upon the material belonging to the U. S. National Museum and that of his own collection. He gave a review of the history of the classification of the Scorpionids dwelling upon the more important characters upon which the various systems were founded. Of the 14 species hitherto known from North America eleven are described by Wood but of the latter's types four species have been lost, among them unfortunately the *Scorpio Allenii*. Dr. Marx finds among Wood's types from the National Museum representatives of the genera *Centrurus, Scorpiops, Hadrurus, Ischnurus* and *Jurus*, but not a single species can referred to *Buthus* and for three the establishment of new genera was necessary.

Prof. Riley read a short note (to be published in the Can. Ent.) correcting some statements of Mr. W. H. Edwards in his recent article on *Fenesica tarquinius*. Mr. Edwards having been led into error by an incorrect report, in *Entomol. Amer* of the meeting of the Ent. Soc. of Washington.

Notice to Members.

The Brooklyn Entomological Society has now secured a room in the new Sængerbund Building, corner of Smith and Schermerhorn Streets in the City of Brooklyn, to which the Collection and Library of the Society have been transferred. The room is open to members with duplicate keys at all times, and the Entomological periodicals and current Exchanges are always on the table. The Librarian and Curator will make arrangements for the use of the Collection and Library at stated times and notice of this will be posted in the room. Duplicate keys can be obtained from Mr. G. W. J. Angell, 44 Hudson St., N. Y., or on meeting nights at the room. It is hoped that members will make free use of the room for informal meetings and discussions.

The Executive Committee.

ENTOMOLOGICA AMERICANA

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Abstract of Address of Rev. Geo. D. Hulst, retiring President, at Annual Meeting of the Brooklyn Ento. Soc.

MEMBERS OF THE BROOKLYN ENTOMOLOGICAL SOCIETY:

There is no need that I should, as I close my term of service as your President, give a summary of the work that has been done in our Science during the last year. In the Address of Prof Lintner before the Entomological Section of the A. A. A. S., and published in our own Journal, you have a summary of Entomological work that I could not hope to better.

I will leave the beaten ground therefore, and speak upon matters which affect only our own local interests. And what I shall say shall be in the line of congratulations and advice.

I. I give you my congratulations. 1st, I call your attention with pride to our exceptional position among American Societies. Strictly Entomological Societies are few in the United States, but among these our Society stands second to none in the position it holds before the World and which it holds by the best of reasons. It has, it is true no inherited wealth, it has no mantle of past great ones; but it has an earnest membership, who do conscientious collecting, and some of these are giving faithful study to their various specialties in the Science, and are taking, or have already taken their place among the best for the work they do. This work has been, in the main, in the line of solid conservative Science. Following this line we stand as we do to-day. A few years ago there were a few, who, arrogating to themselves parts of our field of Science, asked "can any good come out of Brooklyn?" Our efforts, which like all beginnings, were far from perfect, were sneered at

and misrepresented. But patient work and faithful study has won the respect of the Entomological World, and these continued will I hope not only hold that respect, but greatly increase it.

2. I congratulate you upon the stand which our Journal "Entomologica Americana", has among the Entomological Journals of the world. It would not be in good taste to make comparisons; this however I can say, it stands without any superior, past or present, among the Journals of our Country. Its views, its opinions, are respected at home and abroad, and it has assisted by its conservative tendency and substantial work in giving the world at large the idea thatAmericans can do something besides describe species, and make Entomology an annex to Agriculture. In its Synoptic Tables of the Diptera, Hymenoptera, Coleoptera and Lepidoptera more especially of the genera of the latter, it has done work of permanent value.

3. I congratulate you upon the exceptional advantages our members have for study in their access to large and valuable collections especially in the Lepidoptera and Coleoptera. In the Lepidoptera, our local collections are exceptionally rich, and taking my experience as an index, their owners are very willing to have them studied. Taking the collections of Hy Edwards, Graef, Meyer, Neumoegen, Tepper, and in the *Geometridæ* and *Pyralidae* my own, we have an almost complete representation of the fauna of our Country, except in the *Tortricidæ* and *Tineidæ*. As an example, in the *Geometridae* which I am now studying, of the first about 350 species, not more than 5 of identified species are wanting; and of all the species, at least a third of the types are possessed among us. In the Coleoptera we have collections of the *Carabidae* held by Messrs. Smith and Lütgens, not surpassed by any in the Country perhaps except those of Dr. Horn and the late Dr. Leconte. We have also rich collections in the *Cerambycidae* of Mr Leng a world wide known authority, in the *Buprestidae* of Mr. Roberts, in the *Chrysomelidae* of Mr Angell, who are studying these families, and who will I hope, soon do in their fields, the excellent work now being done in his by Mr. Leng. Above all, Dr. Horn has always been ready with material, counsel, and personal help to assist any faithful honest worker. For Dr. Horn, recognised at home and abroad as the greatest Entomologist of America, takes a great interest in our Society, its workers, and its works, especially in our Journal to whose good standing he has very largely contributed. In having him as an Honorary Member, our Society is honored indeed!

4. While not the best, our Society has now good facilities for literature, though it is not in its own possession. The Library in the Central Park Museum of Natural History has the most of the European Sci-

entific Journals complete. The Astor Library has many works special and general on Entomology, and is making constant additions on the recommendations of our Society and Members. Our own Library is not large, but we are now receiving in exchange almost if not quite all the Entomological Journals of the World; and thus we have all current literature at our hands.

II. I give you well intended advice; in this I will be brief, as I have already taken enough of your time.

1. As a necessity we must all be collectors; but while collecting, I urge upon you all to be something more. Be *students*. Seek to know the history of what you collect, and be not satisfied to be told an insect is to be labelled thus and so. Find out always why it is placed where it is.

2. Be not only collectors and students, but *specialists*. Have some part of the family in which you collect, a "hobby". Let it not cover too much ground, but in that genus or subfamily aim to have every species and variety as well as the stages of the life history. Take up new fields not already "hobbies" among our members, and work them. A most excellent field just now for a neat conscientious student is the Tineidae in Lepidoptera.

3. Take notes as you go on with your work, and send them in to the Journal. Tell your friends in other parts to do the same. Some may think its solid Entomology makes Ento. Am. too heavy, and too much a Journal for specialists. Let Ento. Am. have the record of rare captures, interesting observations, and new experiences, and so assist it giving it popularity without weakness.

Finally, set yourselves out to do good work for the Society. Add to its collection of your best. Bring in new members. Seek to increase the interest of its meetings; and the year just begun will be the best year of its history!

Some critical Notes.

By Geo. H. Horn, M. D.

In 1882 there appeared the first part of *Species des Cicindelides* by W. Dokhtouroff of St. Petersburg comprising the Manticorides and Megacephalides. The work has not yet been seen by me but I have recently received through the kindness of M. M. Fleutiaux a copy of his "Remarques et Observations" on the work of M. Dokhtouroff, published "Le Naturaliste" in 1886. Assuming that M. Fleutiaux has correctly quoted the author reviewed, the two publications require a little further comment.

AMBLYCHILA, *Say.*

Dokhtouroff correctly places *Picolominii* as a synonym of *cylindriformis* but our French confreres seem unwilling to admit this and indulge themselves in the belief that they possess the unique type of a distinct species. The type has been examined by Dr. LeConte, and on two occasions at an interval of eight years I have done the same and find no reason for changing the views already published by us. It is quite certain that Dr. LeConte and myself have seen more specimens and from more widely separated localities than Mr. Fleutiaux will probably ever see, so that the question being one of opinion, the entomological public may judge which has the greater weight.

The Amblychila in question was collected by Picolomini quite fifty years ago with other species many of which came into possession of Dupont who disposed of them to friends who described them. The species were all credited to California and for a long time gave us great trouble in their identification. Among those who purchased from Dupont were Chaudoir, Spinola, La Ferte and Motschulsky and the species described have in every instance been recognized as Texan or from the adjacent States of Mexico. In other words Picolomini was not in what is now known as California.

As for the characters separating the Picolomini specimen very little can be said except that it is smoother and blacker than the specimens from Kansas. Unfortunately the French authors know specimens of Amblychila from the two most remote regions of its habitat and specimens from Arizona and New Mexico in the cabinets of Dr. LeConte and Mr. Ulke are exactly intermediate.

While we can not prevent our friends in France from cataloguing two species we can at least enter our protest against the acceptance of their opinion by others.

Here is the proper place to call attention to the spelling of Picolomini's name by Reiche with one "c".

DROMOCHORUS, *Guer.*

This genus seems to be recognized as valid by Dokhtouroff and Fleutiaux and is placed between Omus and Tetracha. A genus to be valid should have characters of its own, but there is nothing that has been seen by Dr. LeConte or myself to separate Dromochorus from Cicindela.

M. Fleutiaux makes the following remark:

"Cependant M. Horn dit quelque part que les differences sexuelles ne sont pas les memes que dans le genre *Cincindela*, en dehors des tarsus

dilates chez les males". I must decline to admit the truth of the above as a quotation of my opinion. In the Trans. Am. Ent. Soc. 1876, p. 236, the following occurs, "In every other sexual character *Dromochorus* does not differ from *Cicindela*." The only point in which *Dromochorus* differs from the *mjority of Cicindel* is—the middle tibiæ are very finely pubescent in both sexes, the males not having the tuft of erect hairs along the outer edge This is however, a character of no value, except specifically, as several other Cicindelæ (*s riga celeripes* and *circumpicta*) are in various ways aberrant from the accepted typical form.

The reversal of the names adopted by Dr. LeConte by M. Salle (Ann. Fr. Bull. 1877, p. 7), seems to require confirmation by an examination of Guerin's type which is now in the possession of Mr. Edw. Janson of London.

No comments requiring notice have been made on *Omus* or *Tetracha* and the genus Cicindela has not been reached, but it is to be hoped that the work will get nearer its completion than did the Monograph of Thompson so beautifully begun in 1859.

Description of a new Cochliipod.

By R. F. Pearsall.

Euclea Elliotii, n. sp.

Head and thorax dark brown. Fore wings dark brown along the costal margin clothed with coarse appressed hairs. A large pea green patch occupies the centre beginning at a point near the base and spreading out to the subterminal portion, forming a triangle, the lower outer corner of which is removed by a sharp rectangular notch. The outer margin and notch bordered with a fine silvery white line, outside which the dark brown of the border becomes reddish brown for a short space. A black costal spot is placed on the upper central portion of the green patch and in one specimen has two brown hair lines running from it toward the apex, A silvery white dot placed on the brown margin near the apex completes the markings. Hind wings yellowish brown tipped on the inner angle with dark brown. Body yellow brown tipped with dark brown. Antennæ in males pectinate for ⅓ their length. Type. Collection of R. F. Pearsall.

Three specimens were reared from larvæ taken in October 1875, on the Sweet Bay.

Larva, (full grown). Length .90 width .30. Color a uniform pale terra-cotta shading into pink on the points of the spinous processes. Dorsal region flat, bordered on each side by a slight ridge on which are placed nine spiny processes the three at each end being longer and stouter. Sides sloping outward and having a series of nine rough pit like depressions in which are the spiracles, below these another row of nine spines project laterally a little stouter than the upper row. Under parts whitish.

I have named this species in honor of my friend S. Lowell Elliot Esq. to whose kind instruction and advice I owe my first impulse toward the study of lepidoptera in their larval stages.

New Species of Geometridae No. 3.

(Continued from from p. 192.)

By Geo. D. Hulst.

Tornos incopriarius, sp. nov. Expands 34 mm. Palpi, head, thorax, and abdomen fuscous; fore wings brownish cinereous, even; three small black discal spots in a triangle; a narrow black dash beyond on veins 5, 6 and 7, the first not reaching margin, the last only on margin; hind wings white with a fuscous shade; discal spot faint; marginal line fuscous; beneath uniform white with a fuscous shade.

1 ♂, Ariz. Coll. Neumoegen. I have all Grote's types before me and believe these to be distinct.

Aspilates opuscularia, sp. nov. Expands 30 mm. Palpi and antennæ fuscous; head and thorax ochreous; abdomen ochreous anteriorly, light ochreous posteriorly; fore wings ochreous with a reddish shade, and with dark brown irrorations especially on submarginal space; three brownish black lines rather broad, very distinct, cross the wings, the first slightly bent outwardly, the second discal straight, the third with a slight sinus at vein 5, all as nearly parallel as possible; a line of marginal black points; hind wings light ochreous, irrorated with brown, with two lines starting from inner margin, one discal, the other outer, both obsolete before reaching middle; a marginal line of nearly confluent black spots; beneath light ochreous, except costally and apically on fore wings, where the wings are reddish ochreous and powdered with black; lines faint towards costa, except the outer which is quite distinct, posteriorly obsolete; marginal lines as above.

1 ♂, Cal. Coll. Holland.

Aspilates behrensaria, sp. nov. Expands 40 mm. Palpi ochreous brown; antennæ fuscous; thorax and fore wing ochreous brown, the brown caused by fine thickly powdered brown scales; abdomen and hind wings light ochreous; the fore wings are crossed by three lines one basal, the second including the black discal point, both straight and parallel, the third strongly sinuate, being much bent inwardly near middle space, and edged outwardly with light ochreous and next to this a row of black dots; the edging light ochreous line often is reddish at inner part of the sinus, and the row of spots sometimes there becomes a dark clouding; the spots are always more distinct towards apex; the hind wings are considerably powdered with brown outwardly, and along inner margin; beneath light ochreous, with fore wings and costal portion of hind wings often reddish.

The ♀ differs from the above, the form of the ♂, in having the brown color replaced with reddish ochreous, the color being often quite bright.

10 ♂, 11 ♀, Cal. Nev. Ariz. Named for Jas. Behrens, Coll. Hulst.

Aspilates desperaria, sp. nov. Expands 34 mm. Palpi light fuscous, front ochreous; vertex and thorax fuscous cinereous; abdomen fuscous ochreous; wings generally fuscous cinereous with diffuse fuscous faint cross lines four in number, the first basal, the second intradiscal, these with a dentation inwardly at middle, scalloped outwardly, parallel; the third extra discal waved; the fourth quite submarginal dentate inwardly edged outwardly with whitish which runs on veins to margin; the second and fourth lines are the heaviest; between these two a slight ochreous tinge continued on hind wings; the outer line only on hind wings agreeing with same line

on fore wings; discal spot on fore wings black, on hind wings white; beneath even smoky cinereous, discal points faint black.

3 ♂, Ariz. Coll. Neum. Hulst.

Aspilates carata, sp. nov. Expands 34 mm. Palpi ochreous brown, black at tip; front purple brown antennae brown; collar and thorax in front purple brown; thorax otherwise yellow; fore wings pointed, falcate, angulated at middle, the basal half to middle line ochreous, beyond that bright yellow; basal half punctate with purple points; there are three purple bands, the first rounded, broken the second extra discal; the third on outer space, the second and third coalesce behind middle; each of the lines ends at costa in a deep purple spot; there is also a purple costal spot just within apex; a partial line of purple dots submarginally; a purple marginal line especially heavy below apex and middle angle; fringe purple. Hind wings rounded, somewhat wavy, ochreous with purple powdering, except at anal angle which is bright yellow; one purple band at middle, marginal line and fringe purple. Beneath as above with bands more emphasized, and the yellow with an orange tint. Legs purple ochreous.

1 ♂, Fla. Coll. Franck; superficially in appearance much like *T. sulphuraria*.

Aspilates crocearia, sp. nov. Expands 23 mm. Palpi, head, antennae at base, and collar purple ochreous; thorax and abdomen dusky yellow; wings bright yellow, somewhat dusky with purple fuscous washing; wings with an outer purple or purple brown broad diffuse line, beginning just within apex on fore wings, oblique, straight, continued on hind wings, where it is slightly rounded; beneath color as above, but strongly irrorated with purple, the broad lines especially distinct and bright; discal spots on fore wings distinct, purple, annulate.

1 ♀, Tex. Coll. Meyer. Resembles in coloration some of the yellow forms of *A. coloraria* Fab.

Aspilates litaria, sp. nov. Expands 34 mm. Palpi, antennae, head, and fore wings fuscous brown; hind wings fuscous; fore wings lightest on middle field; a geminate basal line, rounded, scalloped; middle line close to basal, subparallel; outer line beyond discal spot, sinuate, and with a tendency to become geminate; outer field with a submarginal row of black spots, edged outwardly with a lunule lighter than general color of wing; hind wings wavy on outer margin; with outer line of fore wings, geminate, sinuate; also a submarginal row of black spots; all wings with distinct black discal spots, and black marginal line; beneath light fuscous, strongly washed and irrorated with fuscous; outer lines very faint, inner wanting; a marginal row of black points.

2 ♂, Col. Coll. Hulst.

I add to the above the following:

Tetracis pallulata, sp. nov. Expands 44 mm. Palpi ochreous, dark brown at tip; head, antennae, and thorax ochreous; abdomen light ochreous; fore wings ochreous at base and on outer space, the latter strongly irrorate and striated with purple and brown; two heavy black lines, the inner edged within, the outer without with light ochreous, and both fading gradually into the color of the middle field, which is dark ochreous heavily washed and irrorated with purplish black; hind wings light ochreous, ochreous outwardly, with extra discal purple brown band, strong at inner margin, and fading away beyond discal spots; discal spots on all wings, black;

fore wings considerably angled, the hind wings less; apex sharp, falcate; beneath light ochreous, the lines faintly showing through.

1 ♂, Crater Lake, Or. From Capt. J. C. Merrill, U. S. A. Coll. Hulst. Nearest *T. mellitularia*, Hulst.

Metanema incongruaria, sp. nov. Expands 37 mm. An insect much like *M. quercivoraria*, and which may be a variety, but differs in the following particulars; the wings are all much narrower, and much more produced; the angles at the middle of the wings are more prominent, the outer line in the submarginal space bends in, and meets the median line near vein 3; the median line is very near the middle of the wing, and is so broad that it is rather an ochreous band, and coalesces with the basal band, which also is distinct and broad, at the inner margin; on the hind wings the regular band is broad, basal, not extra discal; the outer angulate line is just beyond of the middle of the wing. The wings are rather narrower than in *Tetracis*, and the insect superficially has little of the appearance of *Metanema*.

1 ♀, Hamilton, Can. (Mr. J. A. Moffatt), Coll. Hulst.

Plagodis keutzingaria, Pack. var. **nigrescaria**, var. nov.

I give this name to the black variety of the above species. It is spoken of by Packard Mon. Geom. p. 468, and is figured pl. 13, f. 51. It differs from the normal form in having the outer line further inward, and in having the outer space purplish black.

NOTES AND NEWS.

The following letter from Mr. A. G. Butler will explain itself:

DEAR SIR!

In H. B. Moeschler's recent paper "On the American species of Utetheisa, *Huebner*," he appears to have entirely overlooked the fact that in 1887 I described as *vars.* '*hybrida*' and '*intermedia*' certain forms of Deiopeia (Utetheisa) tending to link the three types—*D. ornatrix*, *bella*, and *speciosa*. (See my paper in Trans. Ent. Soc. London, p. 361).

* * *

Geotrupes chalybaeus Lec. I received this rare species from a correspondent in Orange Co., Florida, who informs that it was found December 24th, 1885, late in the afternoon about a quantity of horse and mule manure on a sandy road running through high pine lands; males and females were about equally distributed in the sending. The same locality this year failed to yield a specimen.

Morilenia annulatum Say. I received this from Custer Co., Montana. This is the most northerly locality known for *morilenia* and though my friend searched diligently he found only four specimens. C. S. Leng.

FIRST SUPPLEMENT

TO THE

LIST OF COLEOPTERA

OF

AMERICA, NORTH OF MEXICO.

BY SAMUEL HENSHAW.

On the following pages I give such corrections and additions to the List of Coleoptera, published by the American Entomological Society in October 1885, as have come to my notice. So far as I know it includes all additions published up to January 1st 1887.

The authority is given for new genera, the number in brackets indicating their position in the List.

The new species are numbered continuously with the List.

CARABIDAE.

Notiophilus.

9239. aquaticus *Linn.*

Nebria.

9240. frigida *Sahlb.*
9241. parvula *Sahlb.*

Bembidium.

360. = scintillans *Bates.*
392. ‖ = flavopictum *Mots.*

Pterostichus.

562. ‖ = cyanicolor *Chd.*
9242. splendida *Sahlb.*
9243. epipleuralis *Sahlb.*
9244. plana *Sahlb.*

Amara.

9245. angustata ‖ *Sahlb.*

Dicaelus.

Flohri *Bates.* = 713.

Anchonoderus.

844. = myops *Reiche.*

Galerita.

850. = mexicana *Chd.*

Blechrus.

911. =? glabratus *Dufts.*

Chlaenius.

1036. = caeruleicollis *Chd.*
1033. ‡ = chrysopleuralis *Chd.*

Anisodactylus.

1192. = mexicanus *Dej.*
9246. brevicollis *Chd.*

DYTISCIDAE.

Agabus.

1432. = mutus *Sharp.*

GYRINIDAE.

Gyrinus.

1526. = 1521.

HYDROPHILIDAE.

Hydrophilus.

9247. ater *Fab.*

1588 — 1595 belong to Tropisternus Sol. (1587).

9348. apicipalpis *Chev.*

Limnebius.

9249. polita *Casey.*
9250. angustula *Casey.*
9251. alutacea *Casey.*
9252. congener *Casey.*
9253. coniciventris *Casey.*

SILPHIDAE.

Silpha.

1711. ramosa *Say.*
aenescens *Casey.*

SCYDMAENIDAE.

Scydmaenus.

1840. ‖ = Lecontei *Schauff.*

Cholerus.

1853 = 1854.

PSELAPHIDAE.

Batrisus.

9254. mendocino *Casey.*
9255. zephyrinus *Casey.*
9256. speculum *Casey.*
9257. monticola *Casey.*
9258. occiduus *Casey.*

1914—1916 belong to Rybaxis Saulcy. (1913).

Bryaxis.

9259. texana *Casey.*
9260. infinita *Casey.*

1926—1927 belong to Nisa Casey. (1925).

Reichenbachia Leach. (1946).

9261. tumorosa *Casey.*
9262. tumidicornis *Casey.*
9263. informis *Casey.*
9264. gracilicornis *Casey.*
9265. nevadensis *Casey.*
9266. fundata *Casey.*
9267. franciscana *Casey.*

1947—1948 belong to Nisaxis Casey. (1946).

1953—1955 belong to Sonoma Casey. (1952).

Faronus ‡ Lec.

1956 belongs to Oropus, *Casey.* (1955).

Trichonyx ‡ Lec.

9268. convexus *Casey.*
9269, interruptus *Casey.*
9270. abbreviatus *Casey.*

Trimium.

Actium Casey.

STAPHYLINIDAE.

Falagria.
9271. occidua *Casey.*
9272. laticollis *Casey.*

Colusa Casey. (2004).
9273. gracilis *Casey.*
9274. eximia *Casey.*
9275. valida *Casey.*
9276. exilis *Casey.*
9277. grandicollis *Casey.*

2007 belongs to
Pontomalota Casey. (2006).
9278. californica *Casey.*
9279. nigriceps *Casey.*

Lomechusa.
9280. montana *Casey.*

Tachyusa.
9281. experta *Casey.*
9282. linearis *Casey.*
9283. laticeps *Casey.*
9284. faceta *Casey.*
9285. Harfordi *Casey.*
9286. crebrepunctata *Casey.*

Platyusa.
9287. sonomae *Casey.*

Calodera.
9288. attenuata *Casey.*

Maseochara.
9289. californica *Casey.*

Dasyglossa.
9290. prospera *Er.*

Oxypoda.
9291. insignis *Casey.*

Autalia.
9292. elegans *Casey.*

Phytosus.
9293. bicolor *Casey.*
9294. maritimus *Casey.*

Bolitochara.
9295. californica *Casey.*
9296. nigrina *Casey.*

Heterothops.
9297. occidentis *Casey.*
exilis || *Casey,*

Staphylinus.
2141.=viridanus *Horn.*

Belonuchus.
9298. pallens *Sharp.*

Philonthus.
9299. quisquiliarius *Gyll.*

Cafius Steph.
Bryonomus Casey.

Stenus.
2342.=scabiosus *Casey.*
2366.=pumilio *Er.*
2377.=humilis *Er.*
2406.=morio *Grav.*
2449.=tarsalis *Ljungh.*
9300. jejunus *Casey.*
9301. sibiricus *Sahlb.*

Cryptobium.
Hesperobium Casey.

Ababactus.
9302. pallidiceps *Casey.*

2560 belongs to
Trachysectus Casey. (2543).

Caloderma Casey. (2543).
9303. rugosum *Casey.*
9304. continens *Casey.*
9305. angulatum *Casey.*
9306. mobile *Casey.*
9307. contractum *Casey.*
9308. luculentum *Casey.*
9309. reductum *Casey.*
9310. tantillum *Casey.*

Oligopterus Casey. (2543).
9311. cuneicollis *Casey.*

Melon Steph. (2543).
9312. sinuatocollis *Casey.*
9313. convergens *Casey.*
9314. lepida *Casey.*
9315. puberula *Casey.*

9316. malaca *Casey.*
9317. latiuscula *Casey.*
9318. sublesta *Casey.*
9319. consanguinea *Casey.*
9320. contigua *Casey.*
9321. luctuosa *Casey.*
9322. retrusa *Casey.*
9323. gregalis *Casey.*
9324. mimula *Casey.*
9325. languida *Casey.*

Lithocharis.
Metaxyodonta Casey.
9326. alutacea *Casey.*
9327. quadricollis *Casey.*

Lena Casey. (2564)
9328. testacea *Casey.*

2559 and 2673 belong to
Aderocharis Sharp. (2566).

Ramona Casey. 2566).
9329. capitulum *Casey.*

Leptogenius Casey. (2583).
9330. brevicornis *Casey.*

Scopaeus.
9331. rotundiceps *Casey.*
9332. truncaticeps *Casey.*

2545 belongs to
Scopaeodera Casey. (2549).

2546–47 belong to
Leptorus Casey. (2549).
9333. texanus *Casey.*
9334. bicolor *Casey.*
9335. versicolor *Casey.*
9336. longiceps *Casey.*

2550 belongs to
Orus Casey, (2549).
9337. parallelus *Casey.*

Tachinus.
9338. arcticus *Mots.*

Habrocerus.
Eumitocerus Casey.
9339. tarsalis *Casey.*

Platystethus.
9340. spiculus *Er.*

Apocellus.
9341. niger *Casey.*

Phloeopterus Mots. (2802).
9342. filicornis *Casey.*
9343. longipalpus *Casey.*

Vellica Casey. (2802).
9344. longipennis *Casey.*

Lesteva.
9345. truncata *Casey.*

Amphichroum.
9346. flavicorne *Casey.*
9347. alutaceum *Casey.*
9348. pilosellum *Casey.*
9349. veterator *Casey.*
9350. crassicorne *Casey.*

Pelecomalium Casey. (2819).
9351. binotatum *Casey.*
9352. modestum *Casey.*

Lathrimaeum.
9353. humerale *Casey.*

Homalium.
9354. algarum *Casey.*
fucicola || *Casey.*
9355. rugipenne *Casey.*

Orobanus.
9356. densus *Casey.*
9357. rufipes *Casey.*

Protinus.
9358. salebrosus *Casey.*

TRICHOPTERYGIDAE.

Actidium.
9359. rotundicolle *Casey.*
9360. robustulum *Casey.*
9361. granulosum *Casey.*
9362. attenuatum *Casey.*

Ptilium.
9363. sulcatum *Casey.*

Trichopteryx.
9364. Crotchii *Matth.*

Smicrus.
9365. americanus *Case .*

Ptinella.
9366. ? nigrovittis *Lec.*

SCAPHIDIIDAE.

2979 belongs to

Baeocera.

CORYLOPHIDAE.

3023—3024 belong to

Corylophodes *Matth.*

COCCINELLIDAE.

Exochomus.

septentrionis *Weise*=3083.

CRYPTOPHAGIDAE.

Cryptophagus.

9367. beringensis *Sahlb.*

DERMESTIDAE.

Attagenus.

9368. varicolor *Jayne.*

NITIDULIDAE.

Pallodes.

3747. = pallidus *Beauv.*

LATRIDIIDAE.

Cartodera Thoms. (3796)

9369. intermedia *Belon.*

Corticaria:

3797=pubescens *Hummel.*

3804. = fenestralis *Linn.*

3823. = distinguenda *Com.*

9370. fulva *Com.*

BYRRHIDAE.

Byrrhus.

9371. fasciatus *Fab.*

Ditaphrus Casey. (3910).

9372. scymnoides *Casey.*

DASCYLLIDAE.

Euscaphurus Casey. (3987).

9373. saltator *Casey.*

ELATERIDAE.

Melasis.

9374. rufipennis *Horn.*

Stethon.

9375. errans *Horn.*

Eucnemis Ahrens. (4029).

9376. americanus *Horn.*

4046 belongs to

Deltometopus.

Dromaeolus.

9377. nitens *Horn.*

9378. Harringtoni *Horn.*

9379 pusillus *Horn.*

Fornax.

9380. infelix *Horn.*

Microrrhagus.

9381. audax *Horn.*

9382. Bonvouloiri *Horn.*

Nematodes.

9383. pavidus *Horn.*

9384. teres *Horn.*

Phlegon.

9385. Ulkei *Horn.*

Cryptohypnus.

9386. barbatus *Sahlb.*

Elater.

—— ? fuscatus *Melsh.*=4235.

—— ? semivittatus *Say.*=4483.

BUPRESTIDAE.

Buprestis.

4610. = aurulenta *Linn.*
9387 villosa *Lec.*

Chrysobothris.

4639 f. = 4642.
4649 = 4648.
4653 a = 4653.
4655 = 9405.
—— cribraria *Mann.*=4639.
—— dissimilis *Gory*=4639.
—— posticalis *L. & G.*=4647.
—— subcylindrica *Mots.*=4654.
—— errans *Gory.*=S. Amer.
—— frontalis *Oliv.*—S. Amer.
—— thoracica *Fab.*=W. I.
9388. Edwardsii *Horn.*
9389. axillaris *Horn.*
9390. purpureovittata *Horn.*
9391. speculifer *Horn.*
9392. viridicyanea *Horn.*
9393. dolata *Horn.*
9394. ludificata *Horn.*
9395. caurina *Horn.*
9396. Blanchardi *Horn.*
9397. mali *Horn.*
9398. nixa *Horn.*
9399. deserta *Horn.*
9400. lixa *Horn.*
9401. cyanella *Horn.*
9402. humilis *Horn.*
9403. aerea *Chev.*
9404. Merkelii *Horn.*
9405. acutipennis *Chev.*
9406. libonoti *Horn.*
9407. impressa *Fab.*
9408. chalcophoroides *Horn.*
9409. scitula *Gory.*
9410. prasina *Horn.*

Belionota.

—— californica *Mots.*=4666.

Polycesta.

9411. angulosa *Duval.*

MALACHIDAE.

5091 belongs to
Listrus.

PTINIDAE.

Caenocara.

9412. occidens *Casey.*

Dinapate Horn. (5353).

9413. Wrightii *Horn.*

LUCANIDAE.

Platycerus.

9414. californicus *Casey.*

SCARABAEIDAE.

Bradycinetus.

9415. Hornii *Rivers.*

Thyce.

9416. marginata *Casey.*

CERAMBYCIDAE.

Malacopterus.

6016 = lineatus *Guer.*

Toxotus.

9417. nubifer *Lec.*

Leptura.

6319. = nitens *Forst.*
6325. = var. of 6323.
6365. = 6265.
9418. vexatrix *Mann.*

6432 belongs to
Nossodrys Bater. (6448).
contempta Bates=6432.

Tetraopes.

6509. = rubrocinereus *Thoms.*

CHRYSOMELIDAE.

Saxinis.
9419. propinqua *Jac.*

Fidia.
9420. lurida *Lefr.*

Adoxus.
6726 = obscurus *Linn.*

Myochrous.
—— ? plagiata *Melsh.*=6721.

Tymnes.
picipes *Oliv.*=9427.
9421. chrysis *Oliv.*

Paria.
6747. = canella *Fab.*
—— thoracica *Melsh.*=6748.
—— melanura *Melsh.*=6748.

Metachroma.
6757. interrupta *Say.*
? histrio *Lefr.*
6760. = lurida *Oliv.*
—— cuprea *Prov.*=6771.

Graphops.
9422. beryllinus *Lec.*
9423. obscurus *Lec.*
9424. varians *Lec.*
9425. bicolor *Lefr.*

Colaspis.
6774. = suilla *Fab.*
6774b. = Crotchii *Lefr.*
6775. = 9430.
—— chrysis *Oliv.*=9424.
9426. flavicans *Lefr.*

6778 belongs to
Nodonota Lefr. (6777).
strigicollis *Lefr.*=6778b.

Rhabdopterus Lefr. (6778),
9427, picipes *Oliv.*

Prasocuris.
6783. = vittata *Oliv.*

Doryphora.
6786. = 6783.
9428. Behrensi *Har.*

Phyllodecta.
9429. scutellaris *Sahlb.*

Phyllobrotica.
6851. = livida *Lec.*

Luperus.
9430. maculicollis *Lec.*
9431. torquatus *Lec.*

Adimonia.
6902. = femoralis *Melsh.*

Hypolampsis.
rugosa *Oliv.*=6920.

Oedionychis.
9432. Horni *Har.*

Disonycha.
6949. = caroliniana *Fab.*

Haltica.
6964. = var. of 6963.
—— kalmiae *Melsh.*=6963.
9433. polita *Oliv.*
9434. janthina *Lec.*

Lactica.
6975. = tibialis *Oliv.*
6976. = iris *Oliv.*

Crepidodera.
—— iris *Oliv.*=6976.

Chaetocnema.
Lecontei *Duv.*=7039.

BRUCHIDAE.

Bruchus.
longiventris *Sharp.*=7139.

Zabrotes.
9435. subnitens *Horn.*

TENEBRIONIDAE.

Eleates Casey. (7542).
9436. occidentalis *Casey.*

CISTELIDAE.

Cistela.
—— pulla *Melsh.*=7607.

OTHNIIDAE.

Othnius.

9437. guttulatus *Lec.*

MELANDRYIDAE.

Dircaea.=
Phloeotrya Steph.
7671.=Vaudoueri *Muls.*

PYTHIDAE.

Pytho.
7710. = planus *Oliv.*

MORDELLIDAE.

Mordella.
—— atrata *Melsh.*=7780.
—— dimidiata *Melsh.*=European.
—— modesta *Melsh.*=7851.
—— pubescens *Fab.*=7851.
9438. immaculata *Smith.*
9439. flaviventris *Smith.*
9443. carinata *Smith.*

Mordellistena.
9441. erratica *Smith.*
9442. tarsalis *Smith.*
9443. pratensis *Smith.*
9444. conformis *Smith.*
9445. hirticula *Smith.*

MELOIDAE.

Macrobasis.
8060. = torsa *Lec.*

OTIORHYNCHIDAE

Otiorhynchus.
9446. picipes *Fab.*

CURCULIONDAE.

Barinus Casey. (8949).
9447. squamolineatus *Casey.*

CALANDRIDAE.

Sphenophorus.
—— fasciatus *Fab.* Not N. Amer.

9047. belongs to
Allomimus.

SCOLYTIDAE.

9059—9061 belong to
Gnathotrichus.

Pityophthorus.
9448. querciperda *Sz.*

9102 belongs to
Cryphalus.

Dryocoetes.
9116. = autographus *Ratz.*

Tomicus.
9131 = 9101.

Hylesinus.
9449. trifolii *Muell.*

Bothrosternus.
9450. Hubbardi *Sz.*

Renocis Casey. (9175).
9451. heterodoxus *Casey.*

Crypturgus.
9186. = pusillus *Gyll.*

Hylurgops.
9199. = glabratus *Zett.*

Notes on some Species of Geometridae, No. 3.

By Rev. Geo. D. Hulst.

In following our *Geometridae* through the *Acidalinae* and *Caberinae*, I have found not a few problems which it has been impossible for me to solve satisfactorily to myself. Among these has been the determination of the reach of species variation. In the genera *Acidalia*, *Semiothisa*, and *Phasiane* more particularly, species seem to have no limitations. There is great variability, and so called species seem in many cases to overlap each other, so that widely diverse forms, apparently subgeneric in difference, exist with an almost if not quite unbroken intergradation.

But while this is true, and determination is involved in difficulty, and becomes largely a matter of individual opinion, some determinations and conclusions have been reached from a study of the literature, and a comparison of large numbers of specimens which can it seems to me be relied upon. Some of these I give in the following notes.

Euphanessa mendicta, Walk. (*udaria mendica*, C. B. M. Bombyc. p. 576, 1854.) My reasons for believing this to be a Geometer are given Ento. Am. Vol. I, p. 167. I would give it a place in the list next to *Ephyra*, on account of shape of pupa, and the habit common to both of suspending the pupa by the tail, and with a girth of silk about the thorax, after the fashion of the *Papiliones*.

Ephyra culicaria, Guen. (Guen, Phal. 1, 407, 1857.) Mr. Hy. Edwards has a specimen from Ga. which exactly meets the description of Guenee. But it is without doubt the same, with variety difference only, as what is known as *E. myrtaria*, *E. culicaria* was described Phal. I, 407, while *E. myrtaria* was described Phal. I, 408. The name will therefore be *E. culicaria* with *myrtaria* as the name of a variety.

Acidalia ossularia, (Hübn. Geyer, Zutr. f. 909, 910, 1837.) This is a small, very widely spread, and quite variable species. It is found all over the country, and seems to be very common in Texas and Arizona. It varies much in the width and distinctness of the cross lines. While unable to satisfy myself by the descriptions alone, I would not be surprised if *A. magniferaria*, Walk. *A. retractaria*, Walk., as well as some others of his unidentified species, might be synonyms of this one.

Acidalia longipennata,, Pack. (5th Rept. Peab. Acad. Sci. p. 71. 1873.) I am unable to separate this species, and *A. peralbata*, Pack. I do not think they can be separated, even as varietal forms of the same species. Certainly the very frail distinctions upon which by comparison Dr. Packard endeavors to show their difference are variable, and are not shown in his figures Mon. Geom. pl. 10, f. 47, 48.

Acidalia hepaticaria, Guen. (Phal. I, 471, 1857.) Guenee's description easily reveals that this is the insect afterwards described and now generally known as *A. rubromarginata*, Pack.

Acidalia luteolata. Hulst. This insect described Brook. Bull. III, 4'. 1880, as *Cidaria luteolata*, is an *Acidalia* and is intermediate between *A. inductata*, Guen. and *A. sideraria*, Guen..

Acidalia sideraria, Guen. (Phal. I, 450, 1857). This insect was afterwards described as *A. californiata*, and *A. pacificaria*. by Dr. Packard.

Acidalia frigidaria, Moeschler, (Wiener Ento. Monats. p. 44, 1860). Dr. Packard puts this as a varietal form of *A. inductata*, Guen., which indeed it may be. But if we thus place it, and are consistent, there will have to be considerable "lumping" of other species. *A. frigidaria*, bears no closer relation to *A. inductata*, than do *A. sideraria*, and *A. sentinaria*. In my judgement it is nearer *A. sideraria*, than any other form. As species are now determined in this genus it seems to me to have excellent right to specific distinction.

Acidalia magnetaria, Guen. (Phal. I, 450, 1857). This is the insect afterwards described as *A. rubrolineata*, by Dr. Packard.

Acidalia purata, Guen. (Phal. I, 488, pl. 7, f. 6, 1857). Of this species we have not only a description, but a figure given us by Guenee. I can not see how any one can doubt its identity with *A. cacuminata*, Morrison. Zeller gives a more detailed description of the insect than does Guenee, but Guenee's figure is all sufficient for determination,

Phrygionis argentistriata, Streck. This was afterwards described as *Byssodes obrussata*, by Mr. Grote. Mr. Grote makes use of the generic name of Guenee, Mr. Strecker of the Verzeichniss name of Hübner. It is pleasant to see, as the smoke of the Hübnerian conflict in passing away, how Entomologists have come almost to a unanimity concerning the value of the Hübnerian names. Almost no one allows the possibility of the use of the "Tentamen" names. But the names of the Verzeichinss and Zutraege have come into very general recognition. for whatever can be alleged as a valid reason for discarding them, would throw out the most of all generic names prior to Hübner's time, and a very large number of all that have since obtained currency. It is true the determination of the reach of Hübner's genera is involved in difficulty, but in the *Geometridae* that difficulty would hardly be lessened by ignoring them. On the contrary, in the *Geometridae* the adoption of the Verzeichniss and Zutraege names, with the genus based on what is of generic importance in the type specics, would be wonderfully helpful. I confess myself to be one of the converted ones in regard to the Hübnerian genera, and since I have looked into the maze of the genera of the *Geometridae*, I am glad I am converted.

Deilinia quadrinotataria, H. Sch. (Aus. Schm. f. 347, 1855). This was afterwards described by Mr. Grote as *D. septemfluaria*. In his "New Check List", Mr. Grote has the name *D. septemlinearia*. There is a varietal form, quite different in appearance, but Mr. Grote's description and type are exactly the form pictured by Herrich Schaeffer under the name *Trigrammaria quadrinotataria*.

Semiothisa grassata, Hulst, (Brook. Bull. IV, 33, 1881). This is a synonym of *S praeatomata*. Haw. Lep. Brit. 645, 1810. The difference between the two is hardly worthy a varietal name.

Semiothisa patriciata, Grote, (Can. Ent. XV, 129, 1883), is a synonym of *S. multilineata*, Pack., as I learn from an examination of Mr. Grote's type.

Semiothisa vellivolata, Hulst, (Brook. Bull. IV, 34, 1880). This species belongs to *Paraphia*.

Semiothisa sexpunctata, Bates, (Can. Ent. XVIII, 75, 1886). Mr. Bates has very kindly loaned me the types of the three species of *Geometridae* described by him in Vol. XVIII, of the Can. Ent., and my determinations are based upon a study of these types. The above species is a synonym of *S. denticalatu*, Grt. (Can. Ent. XV, 133, 1883.) It differs only in being a very little more clouded cinereous. *S. denticulata*, is in my opinion a variety of *S. granitata*, Guen. and was probably one of Mr. Walker's many descriptions.

Phasiane aberrata, Hy. Edw. (Pap. IV. 48, 1884). This is a synonym of *Napuca orciferata*, Walk. (C. B. M. Geom. p. 1693, 1862), which is at best a variety only of *Aspilates gilvaria*, Linn. I have the type of Mr. Edwards species, a colored drawing of Mr. Walker's type, as well as specimens of *A. gilvaria* from Europe. The American insect is generally considerably darker than the European, but many of the specimens exactly correspond. I have no doubt the reception of specimens from Labrador was what led Mr. Moeschler to state, (Wiener Ento. Monats. VIII, 1866), that he had received *A. gilvaria*, from that country. The species seems Arctic and widely spread. Walker reports it from Arctic America; Moeschler from Labrador; Mr. Edwards' type came from the catch of Capt. Geddes in N. W. Brit. Columbia. Staudinger in his Catalogue states it is found generally through Central Europe, especially in the mountainous districts, as well as far east in Amur. So while in Europe a Northern Temperate species, it does not seem to be Arctic. Mr. Walker's name can stand for a good variety.

Phasiane cinereata, Bates, (Can. Ent. XVIII, 75, 1886), is a synonym of *P. neptata*, Guen. The type is in poor condition, being much denuded, so that the lines are nearly obsolete.

Phasiane mellistrigata G. and R. (Buff. Bull. I, 12, pl. 1, f. 11, 1873) I am unable save as a varietal form to separate from this species *P. trifasciata*, Pack. (6th Rept. Peab. Acad. Sci. p. 46, 1874.) The presence of three dusky lines on hind wings in the latter is a very variable quantity as is also the slight obliquity and sinuousness of the outer line of the fore wings

Phasiane colata, Grt. (Pap. II, 167, 1881.). This is a redescription of *P. nubeculata*, Pack. (Mon. Geom. p. 267, pl. 13, f. 45, 1876.) In some specimens the outer lines are sinuous but the form described by Mr. Grote seems to be the same as that which Dr. Packard named.

SOCIETY NEWS.

Brooklyn Ent. Soc., Dec. 7th, 1886. Nine members present. Discussion was had in reference to a change of locality for meeting, which resulted in the appointment of a committee to lease a room in the Saengerbund Building for one year. Mr. Weeks read a short note on the habit of *Xyloryctes satyrus*. He noticed one evening early in July a loud humming or whirring sound in a small thicket, and succeeded in taking a specimen of *X satyrus*. After vain endeavors to catch them in flight, his attention was drawn to a young ash, and there he found 14 specimens all marching for the roots and one more than half burried in the ground; the sexes being about equally divided. *Buprestidae* and *Arctiidae* were compared and named by the members present.

January 4th, 1887. Nineteen persons present. The reports of officers were read and accepted and that of the president was ordered printed. The following officers were elected: Prest. G. W. J. Angell; Vice Pres., Dr. S. W. Williston; Treasurer, Chris. H. Roberts; Rec. Sec'y, A. C. Weeks; Corr. Sec'y, Wm. Beuttenmueller; Librarian, R. F. Pearsall; Curators, M. L. Linell and Wm. Beuttenmueller; Pub. Com., the Editors and Messrs Hy. Edwards, B. Neumoegen, E. L. Graef, O. Dietz. Exec. Comm., E. L. Graef, A. W. P. Cramer, Chas. Palm, Geo. D. Hulst. The evening was taken up in routine business and no papers were read.

Entomological Society of Washington. 3rd Annual Meeting January 6, 1887. The Treasurer and Recording Secretary presented their reports for the past year and the Society proceeded then to the election of officers for the year 1887 which resulted as follows: President, Mr. L. O. Howard; First Vice-president, Dr. J. G. Morris; Second Vice-president, Dr. Geo. Marx; Corresponding Secretary, Mr. J. B. Smith; Recording Secratary, Mr. E. A. Schwarz; Treasurer Mr. B. P. Mann; Members of the Executive Committee: Dr. C. V. Riley, Mr. Theo. Pergande, Mr. O. Lugger. The annual address of the president, Mr. Howard was then read. After a review of the progress of the Society and certain recommendations as to future policy, he announced as his subject—"A consideration of so much of the morphology of the Chalcididæ as is necessary to the comparative description of genera and species." The address consisted of a brief historical review of the study of this group, dwelling mainly on the characters used by different authors, followed by a somewhat extended discussion of external anatomy of the family as a whole. Each portion of the body was taken up in turn and described, its variations mentioned, and its possibilities in descriptive work discussed.

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Description of new genera and species of North American Myriopoda (*Julidae*)

By C. H. BOLLMAN.

In examining the material of this family in the Museum of the Indiana University and my own collection, I have found that the following species do not appear to be described.

Fam. A. JULIDAE, Leach.

Genus I. NANNOLENE, gen. nov.

Antennae short, subclavate, joints longer than wide, second and sixth subequal, the latter enlarged as in *Cambala*. Mandibulary combs 6 (5), Guathochilarium somewhat spatulate, stipes separated attenuated at the base, mentum entire, exposed, promentum divided almost as in *Cambala* or *Iulomorpha*; lingual lobes denticulated. Segments constricted in the middle, the anterior ten segments striate from the feet to the pore, striae diminishing on the others: at the junction of the anterior and posterior parts of almost every segment are round impressions, larger than the repugnatorial pore, which extend around all the segments except the anterior 6-8. Repugnatorial pore commencing on the sixth segment, placed in the posterior part. Fourth segment footless. Feet long and slender. Male: First pair of legs short, usual number of joints, somewhat thickened, unarmed; penultimate joint of the sixth and seventh pairs of legs produced on the inner side.

This genus is related more to *Cambala*, than any other, although it approaches *Iulomorpha* in the form of the promentum. The following species is the type.

Nanolene burkei, sp. nov. Light brown, a lateral row of large brown spots, a brown band between eyes. Slender, not smooth or pilose. Vertex smooth, a faint median sulcus, setigerous foveolae absent. Antennae equalling the width of body, pilose. Eyes distinct, triangular; ocelli 2 to 5. Segments 50 or 51. Sides of first segment striate, others moderately striate beneath, posterior margin of each segment with fine parallel striae. Last segment rounded; anal valves not marginate, pilose;

anal scale obtusely rounded, pilose. Repugnatorial pore small, not touching the transverse suture. Pairs of feet about 87, extending beyond the sides of body. Male: Mandibulary stipes a little produced in the middle; genitalia concealed.

Length of body 18 mm., width — mm.

Habitat. Utah, California.

I have examined two adults and two young of this species collected by Mr. James K. Burke after whom the species is named.

Genus II. **PARAJULUS**, Humbt. & Sauss.

To this genus belong our larger species of so-called *Julus*. From the latter genus it is easily seperated by the number of mandibulary combs (10), the dwarfed second pair of feet and the form of the first segment of the male with its appendages.

Under the genus *Julus*, Wood says "In all species in which I have had the opportunity of examining sexes, the form of the first scutum distinguishes them with certainty. In the male its antero-posterior diameter is large, and there are well marked lateral margins running nearly at right angles to the others. In the female the anterior posterior diameter is much less, but laterally the scutum is so produced that the anterior and posterior margins may in most cases be said to meet one another at an angle. The males are further distinguished by a peculiar alteration of the first pair of feet, which are transformed into a pair of very large, thick organs."

By applying this remark to those species of which he had both sexes, we have most of the species known to be in this genus at present, The following is a key to the subgenera.

a. First segment enlarged in the male. First pair of feet of male large, crassate, numerous short tubercules on the inner side. **Parajulus.**

aa First segment alike in both sexes. First pair of feet of male short thick, tubercles absent. **Pseudojulus.**

Sub-genus *Parajulus*.

2. **Parajulus castaneus,** sp. nov. Color nearly the same as in *P. impressus*, (Say.) Moderately slender, rough, not pilose. Vertex finely wrinkled, a faint median sulcus, setigerous foveolæ present. Antennæ equalling the width of body. Eyes distinct, triangular, ocelli 54—8. Segments 42—51. Sides of first segment striated, others deeply striate beneath, above with numerous short lines, which are branched. Last segment produced into a moderate spine, projecting beyond the anal valves, not pilose; anal valves not marginate, pilose; anal scale obtusely rounded, small. Repugnatorial pore moderate, touching the transverse suture, which is sharply sinuate. Pairs of feet 66, equalling the width of body. Male. Mandibulary stipes strongly produced; coxae of the second pair of feet as in *impressus*; genitalia about half concealed, composed of three plates; anterior plate round, clavate, pilose; middle plate curving up in front of anterior, and expanding between them into an elongate plate, which has three lobes or spines on the inner side, the first large, the second small and right behind it, the last small, placed near the end; posterior

plate curving upwards and inward till they meet and then outwards, end not bifid. Flagellum not detected. Length of body 23 mm.; width 2 mm.

Habitat. Ft, Snelling, Minnesota.

I have a male and female collected by Mr. George Howe. On account of the bad condition of the female, the ocelli and pairs of feet could not be counted.

Sub-genus *Pseudojulus*, sub. gen. nov.

3. **Parjulus obtectus**, sp. nov. Color as in *impressus*, but more bright. Robust, attenuated anteriorly, not smooth or pilose. Vertex with a median sulcus, setigerous foveolae present. Antennæ exceeding the width of body. Eyes distinct, triangular; ocelli 40–55, arranged in 7–9 series. Segments 50–55. Sides of first segment striate; other segments deeply striate, upper surface almost as in *impressus*. Last segment produced into a rather large and robust spine, projecting beyond the anal valves; anal valves smooth, barely marginate; anal scale moderate, obtusely triangular. Repugnatorial pore large, not touching the transverse suture, which is deeply marginate. Pairs of feet 80–95, extending beyond the sides of body.

Male: Mandibulary stipes not produced much beneath; coxæ of the second pair not drawn out; genitalia concealed.

Length of body 18–30 mm; width 1.8–2.2 mm;

Habitat. Bloomington, Indiana and Florida.

I have examined a large number of females, but only a few males, and I have not attempted to give a description of the genitalia.

4. **Parajulus varius**, sp. nov. Color as in *impressus*, but of a different shade. Slender, not smooth or pilose. Vertex finely wrinkled, a median sulcus, setigerous foveolæ absent. Antennæ exceeding the width of body. Eyes distinct, triangular; ocelli 40–75, arranged in 7–9 series. Segments 50–55. Sides of first striate; others not deeply striate beneath, finely wrinkled and striate above. Last segment produced into a moderate spine, barely passing the anal valves, anal valves not marginate; anal scale large, triangular, sparsely pilose. Repugnational pore moderate, not touching the transverse suture, which is nearly straight. Pairs of feet 75–90, scarcely extending beyond the sides of body.

Male: Mandibulary stipes not much produced beneath; genitalia concealed.

Length of body 18–24 mm; width 1.5–1.8 mm.

Habitat, San Diego, California, (Miss Rosa Smith); Ukiah, Cal., (Mr. James K. Burke); Rossario Mission, Lower California, (Mr. Charles Arcutt.)

I have examined two specimens from San Diego, three from Ukiah, and numerous specimens mostly broken from the latter locality. Those from the last place are very dark in color, but otherwise they do not differ.

Genus **SPIROBOLUS**, Brandt.

Sub-genus *Rhinocrinus*, Karsch.

5. **Spirobolus pensacolæ**, sp. nov. Above dark green, segments margined with reddish brown, face, anterior and posterior segments bright green, feet lighter

than in *marginatus*. Moderately robust, attenuated before, about twelve anterior segments crassate beneath, not smooth. Vertex smooth, sparsely punctate, median sulcus interrupted; elytral foveolæ 8. Antennæ short. Eyes trapezoidal; ocelli 45 7 Segments 49. First segment sulcate, anterior border sinuate; second segment with the lobe not so broad and more nearly triangular, than in *marginatus*. Other segments rough, punctation most numerous on the posterior half; striæ decurved; strong on the posterior half. Last segment pointed, densely punctate; anal valves marginate; anal scale rounded. Repugnatorial pore large. Pairs of feet 92, extending beyond sides of body.

Length of body 86 mm; width 9 mm.

Habitat. Pensacola, Florida.

This species is described from one female, collected by the author in the spring of 1886. It is in all related to *marginatus* rather than any other of our species.

Spirobolus hebes, sp. nov. Ochraceous brown, a lateral row of spots, feet light. Robust, not attenuate, somewhat crassate, not smooth. Vertex smooth, sparsely punctate, median sulcus interrupted; clypeal foveolae 8. Antennae short. Eyes subtriangular; ocelli 29-38, arranged in 6 series. Segments 39-41. First segment acute, more so in the male than in the female; second segment strongly produced beneath; almost subquadrate, rounded. Other segments sparsely punctate, numerous short lines above, striae decurved. Repugnatorial pore small.

Pairs of feet 76–79, short. Male: Coxae of the 3-6 pairs of feet most produced; ventral plate smooth, triangular. Genitalia inner part of anterior plate rough, twice as high as ventral plate, external part with the end rounded and not produced; posterior plate thick, a little bent, the end small and rounded, beneath are two serrated lobes and below these a hard and a blunt lobe.

Length of body 45.48 mm. width 7-8 mm.

Habitat, San Diego, California.

I have examined a male and female of this species collected by Miss Rosa Smith.

JULUS Linnaeus.

Julus owenii sp. nov. Pale brown, a lateral row of spots, a pale oval spot at the base of antennae. Slender, not smooth, not pilose. Vertex rough, a faint median sulcus; setigerous foveolae absent. Antennæ subclavate, equalling the width of body. Eyes indistinct, subrotund; ocelli not all filled out, about 28-6 or 7.

Segments 38-40. First segment thin, striate. Other segments striate above and beneath. Last segment rounded; anal valves not marginate; anal scale triangular. Repugnatorial pore large, touching transverse suture, which is excised. Pairs of feet 54-66, equal to the width of body. Male: Mandibulary stipes not much produced; first pair of legs small, uncinate; genitalia concealed.

Length of body 9,2–16.6 mm.; width .6-.7 mm.

Habitat. New Harmony, Indiana.

This species is described from two males collected by Dr. Richard Owen. It is related to *Julus hortensis* Wood.

Family **POLYDESMIDAE**, Leach.

Genus **PARADESMUS** Saussure.

Paradesmus evides sp. nov. Coloration as in *P. erythropygus*. Form more slender. Vertex smooth, median sulcus continuous, not much excavated between the antennae. First segment more rounded. Inner angle of the lateral carinae not serrated. Genitalia entirely different, short, robust, pilose, scarcely bent, grooved above at the end, and divided into two blunt lobes.

Length of body 26 mm.; width 4 mm.

Habitat. Winona, Minnesota.

I have examined one whole specimen and a number of broken ones, collected by Prof. J. M. Holzinger. This species can be easily seperated from *erythropygus* by the markings of the vertex, the smooth lateral carinae and especially by the male genitalia.

Family **GEOPHILIDAE**, Leach.

Genus **GEOPHILUS** Leach.

Geophilus glaber sp. nov. Olivaceous, head, antennae and mouth parts brown, an indistinct black, median dorsal line. Robust attenuated posteriorly, not pilose, punctate; sternum wider than long; coxae longer than wide (7:5), armed; claw moderately curved, teeth weak.

Cephalic plate large, narrowed behind, longer than wide (10: 8); frontal plate present; basal plate more than twice as wide as long (10: 4), partly covered by the cephalic plate. First joints of antennae long. Anterior spiracle very large, oval; posterior small, nearly circular. Dorsal plates bisulcate; anterior predorsal plate small, posterior large; ventral plates with a median sulcus. Posterior coxae not much swollen, pores above and below, large and small. Last ventral plate large, sides rounded, not converging much. Anal pore large. Last pair of feet of female slender. Pairs of feet of the female 53-55.

Length of body 50-53 mm., width 2.5 mm.

Habitat. ~~Utah~~, California. Ukiah

I have examined three females collected by Mr. James K. Burke.

Observations on some North American Capsidae.

By P. R. Uhler.

Through the kindness of Mr. Andrew Bolter, I have recently received many important forms of this interesting group, some of which were the results of his careful collecting in distant parts of the United States, including localities as widely separated as Florida and California. Dr. Hagen has also sent me for study the extensive collections of these insects belonging to the Agassiz Museum at Cambridge, Mass. Also, other friends too numerous to mention, have placed their specimens at my disposal, so that I have at length been able to study long series of nearly all the described *Capsidae* of North America.

While studying the material alluded to, I have met with certain synonyms; and some new species, which I desire to record at this time.

Nabidea, Uhler. Proceedings. Boston Soc. N.H. 1878, proves to be the same as *Collaria* Provancher: and the species *coracina* Uhler, is his *C. Meilleurii*. It is a form closely allied to *Globiceps* of which one species inhabits Canada and the more Northern States; a second, *C. infuscata* Uhl., is common throughout the Middle and Southern States; and a third inhabits Cuba and San Domingo.

COLLARIA, Prov

C. explicata, new sp. Form nearly of *C. infuscata*, but rather more slender. Color fulvo-testaceous deeper anteriorly and on the basal joint of antennæ and tips of femora. Head smooth before the eyes, the base transversely wrinkled; front prominent, rufous; the superior lobe of cheeks, tip of rostrum, and eyes blackish-piceus. Underside of head prosternum, vertex, and base of all the legs pale yel ow. Rostrum reaching the posterior coxæ. Antennæ about one and a half times the length of the body, slender, fuscous beyond the basal joint. Pronotum coarsely, unevenly punctate, the central raised line, and the collar pale, the callosities distinct and more or less rufous; each side of base is a round velvety black spot. Scutellum slightly duskey, the middle ridge and base paler. Legs long, delicately hirsute, the femora distinctly dotted with black near the base, the nails, tips of femora, and apical portion of tarsi piceous. Wing covers pale testaceous, the clavus, except at base, and the inner half, or more, of the corium dark fuscous; the cuneus and outer margin of the membrane very pale testaceous, remainder of the membrane fuliginous, with the nervures dark fuscous; wings very faintly tinged with fuliginous, iridescent, the veins pale piceous.

Specimens were kindly sent to me from Cuba by Dr. Gundlach, and others were collected by myself in San Domingo.

CAMPTOBROCHIS, Fieb.

C. grandis, new sp. Pale fuscous, or dull chestnut brown, polished. Elliptical, rather more acute at both ends than *C. punctulatus* Illiger. Head generally ivory white at base, dull testaceous on the vertex, with a curved band of black dots between the base of the eyes, sometimes with a central oval pale spot bounded beneath by black dots, and with a black stripe each side of tylus, the tylus, labrum and basal joint of rostrum more or less piceous. Antennæ slender, testaceous, infuscated at base and tip, the second joint feebly thickened at tip, and with a black band at each end. Underside of head piceo-flavous, or testaceous. Rostrum slender, testaceous, piceous at tip, reaching behind the posterior coxæ. Pronotum short, but rapidly narrowing towards the head, polished, convex, very coarsely, unevenly, remotely punctate, callosities black, polished, very distinct, separated by a pale spot; and behind this is sometimes a larger testaceous spot; lateral margin sinuated, the immediate edge ivory white, or pale; humeral angles a little convexly elevated. Scutellum feebly punctate, with the margin, a spot each side at base, and a line at tip pale testaceous, the disk more or less piceous. Pectus and abdomen dark piceous. Coxæ and legs testaceous, with two piceous bands at tip of posterior femora; intermediate and posterior tibiæ generally with two, less distinct, brown bands, and the tips of all the tibiæ and tarsi piceous. Hemelytra pale testaceous, clouded with brown, or nearly uniform brown, polished, punctate. In

pale specimens the corium has a piceous spot near the base, a zigzag band across the middle, and a distinct spot on the outer angle and hind margin, while the pale cuneus has a picous base and tip. The membrane is clouded with fuscous, and has the veins of a darker hue.

Length to tip of hemelytra ♂ 6, ♀ 7½ millims, width of base of prothorax 2½ millims.

The measurements given are taken from the largest specimens. Smaller ones are a full millimetre shorter than the length given above.

Specimens of the smaller size have been taken by myself from Grape-vines during July, in Maryland. Others have been sent to me from Ontario, Canada, by Mr. Petit; from Missouri, by Prof. Riley; from Ohio, by Mr. Wm. Holden; from the northern part of British America, by Robert Kennicott, and from Vancouver's Island, by James Behrens.

This is an unusually large species in the genus to which it belongs, and adds another to the useful forms which roam about over vegetation to destroy the caterpillars of some kinds of small Phalaenidae.

In Canada it reaches its largest size, and in Maryland and Virginia it appears to be generally of smaller proportions.

It hibernates, like its congener, *C. nebulosus*, in hollow or decaying twigs, or beneath loose bark of various trees and vines. In such situations it may sometimes be taken in winter; several specimens being crowded together in the same cavity.

Dysch rius filiformis Lec. I found in July at Coney Island. They were under bits of shingle and paper lying close to the muddy sand a little back from the shore which is only washed by the sea at unusually high tides. They were not buried in the sand, but had made slender tracks as they travelled about and sought shelter by burying themselves when their covering was removed..

Cicindela marginata was at the same place abundant.

C. W. Leng.

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Chrysobothris azurea Lec. was found by Mr. Beutenmüller and myself on Staten Island early in June, and the season ended by July 4th. About 30 specimens were taken by beating a species of Dogwood. The brightly colored insect looked very tempting clinging to the branches in the sunlight. They always rested with the tip of the abdomen depressed and the anterior legs extended.

C. W. Leng.

The larva of Ptinus Latro *Fab.*

By Dr. H. A. Hagen.

Rev. J. E. Werren, of Abington, Mass., brought home last year among other plants the "Edelweiss" *Gnaphalium* (*Leontopodium*) *alpinum* Cass. from Switzerland. The Edelweiss was collected about July on the Seeberg Alps near Greisimmen about 26 miles from Thun. On account of travelling the plants received very poor attention, but as they were perfect, when putting them in the press, it seems to be not probable that the larva were developed then. The plants were not touched since early in August.

The work of the larva was discovered in December, but the beetles were not found until the first week of January. The larvæ have apparently not touched the leaves of the Edelweiss, but had been very voracious on the thick blotting paper; nevertheless (as stated in a former letter) several specimens were eaten through and spoiled by the insects. All other plants were unhurt, though some thicknesses of the blotting paper were also eaten through.

I received one imago and one full grown larva: both had been alive when sent, but during the short trip the imago was killed and all legs to near the base of the femur and the antennæ were eaten, apparently by the still living larva. In a second pair sent to me the imago was alive, but two legs and one antenna eaten by the larva.

The larva is 4 mm. long, corncolored yellow, the head of a pale brownish hue; the whole body thinly covered with pale short villosity; the extreme part of the mouth and the mouth-parts are blackish.

The larva is similar to those of *Ptinus dubius* described by Perris. Ann. Soc. Ent. Fr. 1862, p. 204. The 2 imagos are females of *Ptinus latro* Fab.

As this species is not yet known in N. America, I may draw attention to this fact, as the bettle is not rare everywhere in Germany, and can be, as shown, imported into the U. S. with botanical specimens.

Very few, (only six,) of the larvae of Ptinus are known. The biological collection has one of them, *Pt fur* and besides the earlier stages of *Pt. rufipes* and *Pt. latro* both of them not yet described.

Dianous caerulescens Gyll. I found in great numbers from April to November at a little waterfall on Staten Island. They cling to boards and stones directly under the falls where the force of the water is considerable. C. W. Leng.

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Mr. HULST'S OBSERVATIONS ON PRONUBA YUCCASELLA.

By Prof. C. V. Riley.

On page 184, current volume of "Entomologica Americana", Mr. Geo. D. Hulst is reported as making the following statements in reference to *Pronuba yuccasella*, and I assume correctly since, being one of the editors, he has opportunity to read and probably write his own statements:

"Prof. Riley, after many and extended observations, gave the history of the fertilization of this plant, concluding that the moth is a necessity to the continuation of the plant, that fertilization was effected by it alone and that every developed seed vessel bore evidence of the work of the Moth by the presence of the larvae within the capsule."

He then refers to the method of oviposition and pollination by this moth as described by me, and states that his observations have not brought him to the same conclusion arrived at by me. He further states his belief that there must be very extensive fertilization of this plant by honey bees, because he found these "plentiful about the flowers"; that the majority of the seed capsules examined by him showed no indication of larvae of any sort; and finally refers to the fact that Yucca is sometimes fertile in foreign countries.

There is much error and unwarranted conclusion in the two short paragraphs in which the above information is vouchsafed.

For over 16 years now I have very carefully studied the habits of *Pronuba* in connection with Yucca, not in one locality alone but in nearly every State east of the Rocky Mountains where that genus occurs either indigenously or by introduction. I have also had occasion to study it in many places in Europe in which it is cultivated, and the results have been published in several papers.

In reference to honey bees frequenting Yuccas it is rather strange that Mr. Hulst's experience differs so from mine; for, so far as my experience goes, neither honey bee nor any other honey-loving Hymenoptera frequent the Yucca flowers and this is what we should expect from the very nature of these flowers. They are half closed during the day and do not open until toward evening when bees are hiveward bound; the anthers do not open till then and the pollen is glutinous, adhering in lumps, either on the curled anthers or to the inside of the perianth. It would not adhere to hirsute Hymenoptera, and in point of fact these are not found in the flowers. I have given a list of the insects most frequent-

ly found in Yucca flowers [1] and this list is the result of my own examinations nightly and daily for many years as well as the result of the observations of others. It includes nor Honey-bee nor other Hymenoptera. Neither Mr. T. Pergande nor Mr. E. A. Schwarz, who have often assisted me in my observations (which cannot well be made alone), have seen the honey-bee in these flowers. I would call upon Mr. Hulst to state positively and plainly whether he has ever seen the honey bee within the flowers of Yucca, or in any way carrying pollen which he recognized to be that of Yucca.

Against his statement I will place my own that honey-bees are very rarely seen even about the flowers, and this is in accord with the observations of Herman Mueller, and others, that it is not attracted to white flowers. It might be ever so abundantly flying *about* the flowers without having any possible connection with their pollination unless it gets *within*.

Instead of stating that fertilization was effected by *Pronuba* alone and "that every developed seed vessel bore evidence of the Moth by the presence of the larvae within the capsule" I took particular pains to show, in my very first article on the subject in 1872 [2], that the fleshy-fruited Yuccas exceptionally fructify without *Pronuba*. Subsequently, in 1880 I explained how this might exceptionally occur. In proof I quote:

"It is so very plain from the above quotations that, while I have held and still maintain that it is the rule for our Yuccas to be pollinized by *Pronuba*, I have nevertheless admitted that the rule is not without exceptions. The rarity of Yucca-fructification in those parts of America or in other countries where the plants are not indigenous and *Pronuba* may be presumed not to occur; the uniform failure to fructify whenever the moth has been excluded from the flowers both in my own experiments and those of Mr. J. M. Milligan and of Mr. Meehan; and the non-fructification, even where the moth exists, of those species which bloom either before or after she appears all serve to emphasize the rule." [3]

I have also drawn attention to the occurrence of capsules non-infested with the *Pronuba* larvae and explained why such are found. [4].

My statements in reference to the methods of oviposition and pollination and their consequences, resulted from the most careful study,

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1 Proc. Am. Ass. Adv. Sci., Vol. XXIX., p. 626.

2 Trans. St. Louis Acad. Sci., Vol. III.

3 Proc. Am. Ass Adv. Sci., Vol. XXIX., p. 627.

4 *Ibid*, p. 623.

which can only be made satisfactorily at night with the assistance of a confederate. If Mr. Hulst has any valid reasons for not coming to the same conclusions, he will better advance our knowledge by giving his reasons than by the mere expression of an opinion without evidence that he is in any way justified in it. Until he does the presumption is that he has carelessly observed or has even confounded *Pronuba* and *Prodoxus* as others have done before him.

Finally, I commend to Mr. Hulst a more careful study of my writings upon this subject and especially those in the Proceedings of the American Association for the Advancement of Science for 1880 and 1882, and when he has more critically observed the insect in the plant he will corroborate all that I have written in the way of facts and observations and agree with me that they fully justify the opinions expressed, which may be summed up thus:

I. Yucca by the very nature of its flowers is normally incapable of self-fructification. This is essentially true of the dehiscent species which occur in the Northern States.

II. *Pronuba yuccasella* is modified in the female so as to enable her to gather the pollen and to fructify the fruit. Careful observation of the insect itself proves that function is here, as elsewhere, rightly correlated with structure and that not a solitary case of Yucca fructification by another insect has ever yet been witnessed by any one.

III. The only exception to the fruiting of Yucca without the help of *Pronuba* is in *A. aloifolia*, and while I have admitted the possibility of exceptional pollination by other insects, the fact remains that none have been observed to have the power. I have shown that self-fertilization may take place with this species and that its exceptional fruiting where *Pronuba* is out of the question is more likely due to such fertilization than to the agency of other insects; because, from personal observations, both published and partly unpublished, over the whole region in which the plant indigenously grows, I know the fruit to be abundant where *Pronuba* occurs and that it then always bears evidence of her presence; whereas where she does not occur the fruit is scant and very exceptional.

IV. That a certain variable proportion of Yucca capsules develop without trace of the *Pronuba* larvae is explained by the fact that pollination, as I have shown, often takes place without successful oviposition; or that successful hatching of the eggs or development of the larvae may be prevented from various causes. That pollination is rare without oviposition is proved by my direct observations of the acts and by the fact that comparatively few perfect capsules (or those which do not show the evidence of oviposition) are to be found even where no larvæ have

resulted. The fruit without larvae, bears, with scarcely any exception to those familiar with such tokens, the traces of the ovipositor, or of the partial feeding of a perished larva.

Until the fruit is full grown it is very difficult to detect the larva; and its presence in the softer, partially developed pods is easily overlooked, in ordinary dissection. Such I know to be the fact from extended work in my studies of the hatching and development of the larva. The proportion of infected capsules is best seen in the season when the fruit is matured and the larvae have left it through their characteristic perforations. In short, my experience, corroborated by that of others, is, that the proportion is very small indeed in which the larva does not occur, and that such almost always bear evidence of oviposition having taking place.

Washington, D. C., January 18th., 1887.

Remarks upon Prof. Riley's Strictures.

By Geo. D. Hulst.

Prof. Riley is right, when he says the Society report referred to by him, misrepresents him. Had he called my attention to it, I should gladly have inserted a correction. So far as it touches Prof. Riley, I amend the report, and state as follows: Prof. Riley, after many observations, concludes that the dehiscent species of Yucca are fertilized only by the agency of *Pronuba yuccasella*. A very large majority of the seed capsules of these species shows this by the presence of the larva within; and where the larva is not present, Prof. Riley believes the fertilization has been effected by the moth.

As, at the Society meeting I was speaking of observations upon the dehiscent species only, it it quite likely that the report misrepresents me, as well as Prof. Riley.

Putting in this amended statement, the accuracy of which is witnessed by what Prof. Riley says above, I repeat the substance of the report, following after; my observations have not brought me to the same conclusion arrived at by Prof. Riley. There is no doubt in my mind that there must be very extensive fertilization of the dehiscent species of Yucca by the agency of bees and other insects.

The report gives my reasons. I will here repeat them more in detail.

1st. Dr. Engelmann, to whom we are indebted for the discovery of the fact that *Pronuba* is an agent in the fertilization of Yucca (though he did not work out the history which Prof. Riley has done so well) says in his Monograph of Yucca, (Trans. St. Louis Acad. Sci. Vol. III,) "the

anthers were observed to open a little before the flowers did, and to expel a large grained glutinous pollen." In another place in the same Volume, perhaps in the same connection, (I have mislaid the reference), he says the pollen is expelled with such force that it often falls on the petals, remaining upon them when the flower opens. He thought that the tube and not the summit of the pistil was the stigma thus having the idea that the pollen must be introduced into the tube, that the seeds might be fertilized. But Dr. Thos. Meehan, State Botanist of Penn., than whom there is no more reliable or accurate Botanist, says, (Proc. Am. Ass'n Vol. XXX, p. 205, 1881), that he has in many experiments, made for the purpose during a number of years, easily, and fully fertilized one of the dehiscent species of Yucca "by lightly touching a polleniferous anther to the exposed papillose apex of the stigma." He concludes; "the fact is established beyond dispute through these varied observations, extending now over many years that the mere application of pollen to the papillose apex is sufficient for fertilization". Dr. Meehan has since repeated his observations with the same results and the same conclusion.

Dr. Engelmann shows that the pollen is glutinous and lies exposed upon the anther and petals after expulsion. It is certainly more than probable that the glutinous pollen which will adhere to the petal, will adhere to the claws and legs of insects, and if these be found to any extent in the flowers, extensive accidental fertilization must take place.

2nd. While it is true, as Prof. Riley says, the flowers of Yucca do not open till towards evening, I can say positively from personal observation that they very generally remain open till 10 A. M. when not exposed to the direct rays of the sun.

3rd. I can say positively from personal observation, that business hours for honey bees begin long before that time.

4th. I am thankful that I am able to say I have good eyesight, and that I have never yet felt the need of glasses of any sort. Also I am certain I know a honey bee when I see it.

5th. I positively did see honey bees *within* the open as well the partly open flowers, though quite rarely in the latter. One morning, certainly from five to ten honey bees could be seen at any one time, upon and within the flowers of each cluster of three or more panicles. The bees were of both the Native and Italian races.

6th. Other insects were plentiful. Aphides were very numerous on some of the stems, and many could be seen on the flowers. Coccinelidae, certainly from three to twenty, could be seen upon each cluster of panicles.

7th. The capsules examined afterwards, were all of the dehiscent species and were full grown. Some in being examined were thinly sliced horizontally, others were broken open and the seeds examined singly. Not one in ten showed the larva.

8th. Notwithstanding the appeal to the observations of Herman Mueller, (correctly, I presume), and nothwithstanding the endorsement by Prof. Riley of the conclusion "that it, (the honey bee), is not attracted to white flowers", some of us will continue to believe that honey bees are sometimes attracted to the flowers of Oxydendrum, White Melilot, White Clover, and Buckwheat. I would suppose the Professor meant his statement with a modification, were he not engaged in scolding me because of the loose staements I was reported to have made; There surely can not be a "beam" in his eye, while he is seeking to cast out what is reported to be a "mote" in mine!

9th. The dehiscent species of Yucca do ripen seeds in Europe, so I am informed. No *Pronuba* has ever, to my knowledge, been taken there. The seeds were not artificially fertilized. According to Prof. Riley the flowers are incapable of self fertilization. We are driven then to the conclusion, it must have been done accidentally by other insects and if bees visited the flowers, as likely by them as by any other insects. What has happened in Europe, may and does happen here, though another and perhaps more fruitful agency is at work.

10th. Whether the insects I took were or were not *Pronuba* has nothing to do with my reasons for doubting Prof. Riley's conclusion. I question not his observations or statements, but his conclusion. Very much he has written above is irrelevant to my reported statement as well as personal beliefs.

In view of the above I still believe as the report says. I take no exceptions to Prof. Riley's observations upon *Pronuba*; I lay no claim to his ability or experience; I compare myself with him in no way. But, with becoming humility, I do claim that my observations when positive have some right to stand against his, when only negative.

SOCIETY NEWS.

Brooklyn Entomological Society. February 1st, 1887. — 14 persons present. Mr. G. Beyer was elected a member of the society. The regular meeting was taken up entirely with the consideration of recommendations of the various committees and officers in regard to the furnishing of the new rooms and the use of the Library and collections. After adjournment specimens were exhibited and exchanged.

Entomological Society of Washington. Meeting held February 10th, 1887.—Mr. Mann gave a review of his work on the Bibliography of Economic Entomology partly done by him privately in former years and partly during his connection with the U. S. Entomological Commission and the U. S. Department of Agriculture. After several interruptions and changes in the plan the work is now partly completed and ready for publication.

Mr. Schwarz exhibited an undescribed species of *Phytobius* from Michigan, and described the peculiar characters of this genus which are indicative of an aquatic mode of life. He read in translation Perris's account of the life history of *Phytobius velatus* which lives in all stages under water on the leaves of *Myriophyllum spicatum*.

Mr. Schwarz read a paper on the sexual characters in the N. A. species of *Anaspis*. There is great discrepancy in the descriptions of these characters given by Dr. LeConte and Mr. J. B. Smith, while his own observations led him to disagree with both authors. He had examined males of 4 species and finds that the abdomen is never excavated but provided with two long filiform appendages arising from the apex of the 4th ventral segment. In most specimens, however, the appendages are closely applied to the ventral surface so that their real nature is readily overlooked, and the abdomen presents then in a most deciptive manner the appearance of being excavated. The appendages appear to be movable in an up and downward direction but are not capable of lateral movement. This structure is modified in the different species and affords a much better criterion for the distinction of the species than those now used in the tables.

Mr. Schwarz related a conversation he recently had with Dr. Horn regarding the stridulation of *Harpalus caliginosus*. It appears that Dr. Horn distinctly heard the sound in a specimen when this was at liberty and undisturbed, and this fact explains the failure of other observers who always tried to make the *Harpalus* stridulate when the specimens were handled. In all other stridulating Coleoptera the sound is more frequently heard when the specimens are frightened or handled or otherwise in a state of excitement.

ERRATA.

Page 55, line 4, from bottom, for horbaccous, read herbaceous.
" 70, " 12 of first column, for *Saerda* read *Saperda*.
" 79, for *Pyrrhaitia* in explan. of figure, read *Pyrrharctia*
" 106, line 21, for Agnotemyia, read Agnotomyia.
" 179, " 17, for useless, read useful.
" " " 35, for peste, read pests.
" 190, " 18, for straighed, read straight.
" 199, " 9, for mormornia, read mormonus.
" 204, " 25, for *Scorpionidal*, read *Scorpionidae*.
" 209, " 5, for *mjority of Cicindel*, read *majority of Cicindela*.
" 221, " 16, for *mendicta*, read *mendicata*.
" 223, " 19, for *denticulatu*, read *denticulata*.

For notes as to errata see pages 137 & 164 a.

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